DOCUMENT RESUME

ED 106 504 CE 003 670

AUTHOR	Altschuld, James W.; Pritz, Sandra
TITLE	Planning Construction Projects: An Evaluation Report for the Occupational Exploration Program.
INSTITUTION	Ohio State Univ., Columbus. Center for Vocational and Technical Education.
PUB DATE	Sep 74
NOTE	156p.; For related volumes see CE 003 668-675
EDRS PRICE	MF-$0.76 HC-$8.24 PLUS POSTAGE
DESCRIPTORS	Analysis of Variance; *Career Education; *Construction Industry; Evaluation Criteria; Grade 8; Grade 9; *Junior High Schools; Occupational Choice; Occupational Information; Pilot Projects; *Program Evaluation; Questionnaires; Role Playing; School Construction; *Simulation; Statistical Analysis; Student Reaction; Teaching Methods
IDENTIFIERS	*Career Exploration; Occupational Exploration Program; OEP

ABSTRACT

The evaluation report is one of seven produced for the Occupational Exploration Program (OEP), a series of simulated occupational experiences designed for junior high school students. Describing the pilot testing of the simulation dealing with construction, the report contains sections describing the simulation context, evaluation procedures, results, and a Reviser's Information Summary (RIS). In the simulation, students planned a new junior high athletic facility. Occupational roles included architect, junior architect, civil engineer, draftsman, community representative, board of education representative, and superintendent of schools. The experimental design involved two Colorado schools, with a total of four experimental and four control groups involving 92 eighth and ninth graders. Instrumentation included knowledge and affective testing, student and teacher questionnaires, and a panel review. Analysis of variance and other descriptive statistics were employed, and reliability estimates were calculated. Analysis of variance results revealed that the simulation had a positive impact on student occupational knowledge, but no statistically significant impact on occupational preferences. The RIS records and extrapolates trends related to the strengths, weaknesses, and recommendations from all data sources. Appended materials include the evaluation instruments used and the teacher log. (MW)

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PLANNING CONSTRUCTION PROJECTS
AN EVALUATION REPORT FOR THE
OCCUPATIONAL EXPLORATION PROGRAM

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September, 1974

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ABSTRACT

PLANNING CONSTRUCTION PROJECTS

EVALUATION REPORT FOR THE OCCUPATIONAL EXPLORATION PROGRAM

By: James W. Altschuld; Sandra Pritz

This report is one of seven evaluation reports produced for the Occupational Exploration Program. The Occupational Exploration Program (O.E.P.) is funded by the National Institute of Education and is a joint development effort of The Center for Vocational Education (The Ohio State University) and the Jefferson County, Colorado public schools. O.E.P. is a series of experiences designed to provide junior high school students with the opportunity to explore occupations. One of the major vehicles for exploration is the simulation technique. In 'FY' 1974, 12 simulations were developed and seven of those twelve were pilot tested. This report describes the pilot testing of the simulation dealing with construction. The report contains sections describing simulation context, evaluation procedures, results and a Revisor's Information Summary (RIS). The RIS is useful for a variety of purposes and includes the strengths of the simulation as well as its weaknesses. Below is a synopsis of the specific content of the report.

SIMULATION CONTEXT: The participants of this simulation are involved in planning a new junior high athletic facility. The building of a new highway will destroy the present athletic facilities at the junior high. The participants become representatives of an architect's firm, the community, and the school, and simulate the planning processes concerned with the design, selection of site, and cost of the new facilities. In this simulation, the occupational roles include architect, junior architect, civil engineer, draftsman, community representative, board of education representative, and superintendent of schools. EXPERIMENTAL DESIGN: For evaluating this simulation, two schools, one in Jefferson County, Colorado and one in Denver, Colorado were used, each school having two experimental and two control groups. A teacher facilitated the implementation of the simulation with each experimental group. The experimental and the control groups consisted of 8th and 9th graders; the four experimental groups totaled 50 students and the four control groups totaled 42 students.
INSTRUMENTATION: A 42 item multiple choice knowledge test, "What Do You Know?", and 5 item affective test, "What Do You Like?", were administered as pre- and posttests measuring student knowledge gain and attitudinal change. The student post module questionnaire, "What Do You Think?", administered to the experimental group after completion of the simulation, measured student perceptions of the module. Teacher questionnaires and a panel review were designed for the purpose of obtaining teacher perceptions of the simulation. ANALYSIS: The knowledge test and affective test results were derived through analyses of variance. Other descriptive statistics were employed where appropriate (i.e., frequency, percentage). Reliability

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estimates were calculated to obtain the internal consistency estimates of the knowledge test and to determine inter-coder and intra-coder assessment for the attitude scale. RESULTS: The ANOVA results reveal that the simulation had a positive impact on student occupational knowledge in the construction field ($p < .05$). In addition, the results did show shifts in student occupational preferences but, the changes were not statistically significant. Teachers and students were generally positive about the overall module quality as indicated from student and teacher comments collected from questionnaire data. REVISOR'S INFORMATION SUMMARY: The RIS was designed to not only assist revisors to assimilate information collected during the pilot-test, but also as a unique way of summarizing the data. The summary is a record of the strengths, weaknesses and recommendations for revisors from all data sources (i.e., student tests, student questionnaires, teacher questionnaires, etc.). Trends have been extrapolated which list the most apparent strengths and weaknesses of the simulation as well as recommendations to be considered in the revision of the simulation.

Acknowledgements

An evaluation report is usually a product of the endeavors of many individuals. The authors of this report therefore wish to thank:

1. Suzanne Damarin and Raymond Hinrichs for helping to develop some of the instrumentation used in this evaluation;
2. The teachers, administrators, and students in Jefferson County, Colorado and Denver, Colorado who, by participating in the use of educational materials and in the testing of those materials, made this evaluation report possible;
3. Jon Schaffarzick, Michael Hock, and David Hampson of the National Institute of Education for their support of this effort; and
4. **The eleven project staff members identified on the cover, who** by their support, expertise and/or direction contributed to the production of this report.

TABLE OF CONTENTS

I. BRIEF DESCRIPTION OF THE MODULE 1

II. DESCRIPTION OF EVALUATION PROCEDURES EMPLOYED 5

A. Specific Sample Used 5

B. Types of Classes and Groupings 10

C. Experimental Design as Implemented 11

D. Instrumentation-Instrument Specifics 16

III. RESULTS 24

A. Knowledge Test 24

B. Attitude Scale 28

C. Student Questionnaire 34

D. Teacher Log and General Module Evaluation 50

E. Teacher Post Module Panel Review 52

F. Analysis of Variance for Knowledge Test Data 60

G. Analysis of Variance for Attitudinal Data 61

IV. REVISER'S INFORMATION SUMMARY 63

APPENDICES

A. Knowledge Test - "What Do You Know?'

B. Attitude Scale - "What Do You Like?"

C. Student Questionnaire - "What Do You Think?"

D. Teacher Log and General Module Evaluation /

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Planning Construction Projects

I. Brief Description of the Module

The construction module consists of a preview*, a preparation section, seven major activities, and a summary. The Preview* is available in two forms, a booklet and a slide tape, both of which present the situation that provides the framework for the simulation. The building of a new road will destroy the athletic facilities at the junior high school. A planning team with representatives from an architect's firm, the community, and the school must design new facilities. An overview of the roles and the kinds of tasks to be performed is designed to give students information on which to make a decision about participating in the simulation. The preview is scheduled for one period.

The Preparation Section is a resource packet of materials designed to help the students to learn more about the role alternatives and to select a role. Students are directed to fill out a Job Interest Form and to score it by using an overlay. Then they read a Job Description Sheet and use the input from both to decide on job priorities and fill out a Job Preference Form. Their role is generally their first preference unless there are duplicate preferences. The preparation takes about one period.

In each of the first four activities there are two tasks carried on concurrently by designated students. Handbook 1A, Contacting an Architect, (with corresponding talking pages) describes a selection procedure whereby the Board of Education Representative and Superintendent can review the work and background of two different architects, choose an architect, and work out a contract with him/her. Meanwhile, using Handbook 1B, Finding Sites, plus a slide tape program and talking pages, the Civil Engineer, Draftsman, and Community Representative review the sites available with regard to location, safety, size, cost, and conditions. They narrow the alternatives down to the four most suitable. The time required for Activity 1 is two periods.

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*Prior to the preview, the students have seen a slide/tape and/or a booklet on Introduction to Simulation.

In a slide tape program and Handbook 2A, Identifying Client's Needs, the student playing the Architect is guided through a meeting with the Superintendent, Board of Education Representative, and Community Representative to determine exactly what kind of facility is needed.

The other students using Handbook 2B, Sketching Sites, and a set of slides, continue to work on the site alternatives by preparing sketches of the four selected previously. Both groups spend one period on this activity.

Handbook 3A, Writing Specs., is used with a slide tape program to pursue the conversion of the list of the client's needs into an acceptable design for the facility. Specifications are prepared by the Architect and reviewed by the Superintendent and the Board of Education Representative. The Draftsman, Civil Engineer, and Community Representative use Handbook 3B, Evaluating Sites, with corresponding talking pages, to complete detailed reports on the location, cost, and condition of the four possible sites.

After one period, all students except the one playing the role of Architect go on to Handbook 4B, Putting the Puzzle Together, where, with the aid of a slide set, the group is directed to use templates to represent parts of the facility and to plan the optimum layout of the facility for each of the site alternatives. During this period, the Architect uses slide tape 4A and Handbook 4A, Creating a Design, to design and sketch several versions of the building for the athletic facility.

In Handbook 5, Selecting Site and Design, the entire group is directed to hold a meeting for one period to hear the results of the site evaluations and to see sketches of the proposed building. At the conclusion of the meeting, a final site and building design are chosen.

Handbook 6, Making Final Plans, is available in several versions according to role and is used for three periods of activity. A videotape, "Surprise! We have to build a model," introduces the client's request for a model of the facility. The Architect oversees construction of the model by the School Board Representative, Superintendent, and Community Representative who act as members of the architectural firm. The Junior Architect makes final working drawings of the site plan and a landscape plan; the Civil Engineer does the final drawings of the structural specifications; and the Draftsman does the final drawings of the floor plan and elevations. All of the students are involved in some aspect of representing the plans to a specified scale.

Handbook 7, Presenting Plans, gives directions for a one period group meeting for the purpose of presenting the completed drawings, specifications, and model to the client. At the conclusion of the meeting there is a brief review and evaluation of the total construction planning project.

The Summary for the module consists of three tasks, the first of which focuses on individual reactions with the original Job Interest Form, a Job Analysis Form and Evaluation Sheet as guides. Task 2 allows for the preparation of presentations for a group discussion so that the participants can share their experiences and personal feelings about what they did during the simulation. Task 3 encourages the students to review and update their occupational exploration plans. The summary takes approximately three class periods.

The overall length of the construction simulation is about 15-17 periods. By working through the module, students are exposed to the basic facets of and careers involved in a construction planning project.

II. Description of Evaluation Procedures Employed

A. Specific Sample Used

1. **Schools** - for this module one Jefferson County and one Denver school were used. In Jefferson County there were two experimental groups and two control groups. In Denver the sample consisted of one experimental classroom and one control classroom. The experimental classroom in Denver was subdivided into two separate experimental groups, which independently carried out the simulation. (To accommodate the experimental design, the two experimental groups in this classroom were considered to be separate classrooms. In addition, the control classroom was randomly divided and treated as two groups.)

   The schools and the teachers were selected via discussion with administrators and teachers in each of the districts. A brief description of the schools follow:

O'Connell Junior High School
(Grades 7-9), Jefferson County

O'Connell Junior High School is the largest junior high school in the Jefferson County school district with close to 1,300 students. The large number of students has required the school to be on a split session basis with 8th and 9th graders attending in the mornings and seventh grade students attending in the afternoons. The school uses a floating period schedule to provide for flexibility in student groupings. The school draws its student population from two neighborhoods. One is in a somewhat older section of the city and the other is in an area with many homes ranging up to $50,000 in value. There is a large mix of socioeconomic backgrounds represented in the student body. A small percentage (exact figures were not supplied by the school) of the students come from families receiving welfare or Aid for Dependent Children (ADC), whereas several families in the district have incomes exceeding $100,000 per year (again, exact figures were not available). The racial make-up of the school is primarily Caucasian (85 percent), with 13 percent of Spanish descent and 2 percent in other groups. Although data was not provided, school officials state that student achievement is about average for the district.

Rishel Junior High School
(Grades 7-9), Denver

Rishel Junior High School is a large school with approximately 1,400 students. Data regarding achievement, socioeconomic status of the community supplying students to the school, etc., were not available from the school at the time of this writing. In its stead the on-site observations of this writer (J. W. Altschuld) will be substituted.

The student body of Rishel is primarily Caucasian (Anglo) with a small (5-15 percent) percentage of students from Spanish speaking backgrounds. The immediate area surrounding the school is middle class with homes ranging from approximately $22,000 up to the$30,000-35,000 range. The student population in the school comes from a large geographic area as judged by the number of school busses unloading at the school during the site visit. (Further information regarding this school will be supplied as it becomes available.)

2. Sample Within Schools

a. Teachers

In O'Connell Junior High School two female teachers volunteered to participate in the teaching of the module. The following demographic data was collected:

Years of Teaching Experience

1 year or less (N=1), 2-4 years (N=1)

Subject Area Usually Taught

English (N=2)

Prior Experience with Simulation Techniques

As a participant and as a teacher (N=1)

No previous experience (N=1)

In Rishel Junior High School one female teacher volunteered to participate in the teaching of the module. The following demographic data is available:

Years of Teaching Experience

8 or more years (N=1)

Subject Area Usually Taught

English (N=1)

Prior Experience with Simulation Techniques

No prior experience (N=1)

b. Students

The sixteen students who participated in the Denver experimental groups consisted of 12 males and 4 females. The students were selected (randomly) from an intact English classroom. The control group students who participated in both pre and posttesting totalled 13, with six male students and 7 females. The students were volunteers from an 8th grade language arts class.

The groups of students from Jefferson County who participated in this pilot test were somewhat larger. The experimental group consisted of 34 students evenly divided between males and females. The students were members of intact English classes. The control groups consisted of 29 students, 15 males and 14 females. These students were volunteered from existing 8th grade language arts classes.

In summary, the sampling was more mixed than ideal. It was impossible to conduct more systematic sampling due to program and organizational constraints within buildings. On the other hand, there are some very positive aspects of the situation. All classes involved in the testing of this module were either language arts or English classes. Moreover, the overall male to female balance was relatively good in most groups utilized for the pilot test.

When considering the experimental circumstances under which this module was tested, pretest group differences may be observed. The approach taken in the analysis however, is one which accounts for the initial differences and tends to eliminate bias toward achieving spuriously, statistically significant results. In other words, the sampling procedures may have led to somewhat unequivalent groups, but the design and analysis take these differences into consideration.

Again, it should be noted that experimental results are based only on students who took both the pre- and posttest. There was sample loss in the testing of the module as follows:

- Denver experimental groups, of the 22 students who started the module, 6 students were lost (27 percent loss).
- Jeff Co experimental groups, of the 41 students who started the module, 7 were lost (17 percent loss).
- Denver control groups, of the 18 students who participated in the control group, 5 did not complete both pre- and posttest (28 percent loss).
- Jeff Co control groups, of the 39 students who participated in the control groups, 10 did not complete both pre- and posttest (26 percent loss).

Sample loss is always difficult to account for in an experimental situation. Some students may have been sick or otherwise out of the classroom during the pre- and posttesting time. The logistical set-up for the test of this module required that an administrator be present at each testing session. Provisions for follow-up testing of students who missed a session were not feasible given the available manpower in the field. Some students may simply have avoided taking the tests. The sample loss in this instance is somewhat large (i.e., in excess of 20 percent). It is generally evenly distributed across the groups who participated in the module. Assuming that there will ordinarily be a 12-15 percent loss rate, the loss in the test of this module will be considered as only slightly above a normal rate. It does not seem to be large enough to invalidate the results of the experimental design and efforts will not be made to study the loss in any detail.

B. Types of Classes and Groupings

The type of class or group setting in which the module has been tried is important in regard to interpreting the module results. In Denver the students who participated were able to experience it in a manner similar to that intended by developers. Two small groups of student volunteers from an English class were used in the pilot test. While the rest of their class engaged in other activities (e.g., reading, group discussions, etc.) the two groups met separately in the school library. They then conducted simultaneous, but independent simulations. The module was thus used generally free of competing distractions and no doubling up of roles was necessary.

In Jefferson County a similar situation prevailed. Two English classrooms were volunteered by their respective teachers to participate in the tryout of the construction module. Since both these teachers felt that it would be difficult to divide their classes into two groups - one doing the simulation and the other doing "make-work" types of activities - they requested enough materials to run two simultaneous simulations in their classrooms. Materials were so provided and essentially all students in each classroom participated in the simulations. To accomodate the experimental design, however, each entire class was treated as a single group. (Note: this can also be defended on the grounds that physical conditions in the two classrooms were far from ideal. As such, there was more than likely a great deal of interaction between the simulation groups. In other words, the independence of the simulating groups is highly questionable.)

C. Experimental Design as Implemented

Given the small size of the experimental groups, it was decided not to partition the design by sex as specified in the proposal. This eliminates the possibility of studying and comparing the test scores of males and females within the design framework. Aside from this small change, the design is basically the one stated in the proposal. Schematically it is as follows:

Figure 1 - Schematic of the Experimental Design for the Education Module

		Pretest	Posttest
RISHEL (DENVER)	Experimental Group 1	S_1* ' ' ' S_N	S_1 ' ' ' S_N
	Experimental Group 2		
	Control Group 1	S_1 ' ' ' S_N	S_1 ' ' ' S_N
	Control Group 2		
O'CONNELL (JEFFERSON COUNTY)	Experimental Group 1		
	Experimental Group 2		
	Control Group 1		
	Control Group 2		

*In order for a student's scores to be included in the analysis, he/she would have had to participate in both the pre and posttest.

The analysis will be the same as designated in the project proposal for the Occupational Exploration Program (Fy '74) with the exception that the sex variable has been deleted. Of key interest will be the interaction between the experimental-control variable and the pre-posttest variable. If the module has had an impact upon students, a significant interaction would be expected with the source of the interaction being a sizeable experimental group gain on the posttest. Separate analyses will be run for the total cognitive test scores as well as for several dimensions of the attitudinal scale. The analyses will be in accordance with the abbreviated summary table shown below.

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Table 1 - Partial Anova Summary Table
For The Construction Module

Term No.	Source*	df	Potential F Test
	Between Students	abcn-1	
	Between Classes	abc-1	
1	A	a-1	1/4
2	B	b-1	2/4
3	AB	(a-1)(b-1)	3/4
4	C/AB	ab (c-1)	4/5*
	Within Classes	abc (n-1)	
5	E/C/AB	abc (n-1)	
	Within Students	abcn (d-1)	
6	D	(d-1)	6/10
7	AD	(a-1)(d-1)	7/10
8	BD	(b-1)(d-1)	8/10
9	ABD	(a-1)(b-1)(d-1)	9/10
10	CD/AB	ab(c-1)(d-1)	10/11
11	ED/C/AB	abc(d-1)(n-1)	
	Total	abcdn-1	

*A brief discussion of the variables will be included in the text immediately following this table.

**The results from the two starred F tests are especially important in that if the test yields an insignificant F ratio, then the two terms 4 and 5, and 10 and 11, could be respectively pooled and used for the remainder of the appropriate F tests.

The independent variables for this module are described below:

Variable	Description	
A	Treatment (experimental vs. control)	Fixed; between levels of C
B	Schools (Denver vs. Jefferson County)	Fixed; between levels of C
C	Classrooms (N=8)	Random; nested within AB
D	Testing (Pre vs. Post)	Fixed; within S's (repeated measures)
E	Students	Random; nested within CD

D. Instrumentation - Instrument Specifics

1. Knowledge Test - What Do You Know? (The test is appended to this report).

The knowledge test for construction consisted of 42 questions. The test is a mixture of question types which is probably a reflection of the fact that this was the first test produced for the evaluation of the products in the Occupational Exploration Project. The test included the following question types:

-- 17 Multiple Choice Questions (3 distractors, 1 correct choice);

-- 1 Situational Question with 10 subparts contained within it;

-- 3 Multiple Choice Questions (1 distractor and 1 correct choice);

-- 12 Multiple Choice Questions (with 2 distractors and 1 correct choice.)

For purposes of analysis, each part of a question with more than one part was treated as though it were a single question. Thus, the test contained 42 total questions.

In general, the questions were at a low comprehension level in relation to the Bloom Taxonomy. Four basic thrusts or areas were emphasized in the test—process, responsibility, environment/tools, and skills. Below are examples of the four basic thrusts as well as of the question types discussed in the preceding paragraph.

An example of a process question is:

Test Question #12 (Situational Question with 10 subparts)

Mrs. Smith wants to build a swimming pool in her backyard and has hired an architect to help plan it. Which of the questions should the architect consider in planning the pool? (Check those questions that you think the architect should consider.)

___* Where are the water pipes for the house?

___ Do the Smiths swim well?

___* Is the electrical wiring for the house above or below ground?

___* Where are the trees and other shrubbery?

___* What are the local laws about swimming pools?

___ What is the amount of traffic on the street in front of the house?

___* What is the average number of people likely to use the pool?

___ How much chlorine is necessary to purify the water?

___ How many pets do the Smiths have?

___ How many swimming pools are there in the city?

*Denotes a correct answer

Process questions generally deal with understanding the nature of steps involved in planning a construction project. The student would have to develop an understanding of the sequence of activities that occur in planning; that architects, engineers and draftsmen have to be responsive to the needs of clients, etc.

The second basic thrust of the test is the area of job responsibility. The students are tested on who has the responsibility for getting a job done or for making decisions at a certain point in time, etc. Test question #7 is representative of the class of questions dealing with responsibility.

Test Question #7 Multiple Choice Question, (3 distractors and 1 correct choice.)

The national headquarters of a large insurance company is located in your city. The company has made a decision to double the size of their present office building. Whom would they contact in a typical architecture firm about getting plans developed for the addition to the building?

*a. The principal architect

b. The draftsman

c. The artist

d. The civil engineer

*Denotes correct answer.

A third major group of questions on the test dealt with the category of skills. The students are tested on the types of skills or special abilities that would be helpful in terms of performing in occupations related to the planning of construction projects. An example of a question in this area is given below.

Test Question #14, Part 2 (Multiple Choice Question, 2 distractors and 1 correct choice).

Part 2 was one of 12 parts. The students were instructed to circle the letter corresponding to the skill which they felt was more important for jobs involved in planning construction projects. If they felt both skills were equally important they were instructed to circle letter C.

A *B C A. Lifting Heavy Objects

B. Knowing Strength of Materials

*Denotes correct answer.

The last group of questions on the test and by far the smallest group (N = 4) dealt with the category of environment/tools. Here the questions were designed to probe into the student's understanding of different environments and/or tools used in the planning of construction projects. Emphasis was placed on what were considered to be common misconceptions as illustrated by Test Question #10.

Test Question #10 (Multiple Choice Question, 3 distractors and 1 correct choice).

For planning a construction project, which of the following groups of tools would be most useful?

a. Hammers, saws, squares

*b. Drawing boards, scales, triangles

c. Electronic gauges and meters

d. Electric drills and sanders.

*Denotes correct answer.

2. Affective Test - What Do You Like? (Appendix B)

The affective test was designed to measure attitudinal change on the part of the student. The first five questions consist of asking the student if he/she would like to try doing an activity. The student could respond in one of four ways to the item.

- Yes, I would like to try this.
- No, I would not like to try this.
- I'm uncertain about trying this.
- I don't have enough information to know if I would like to try this.

The scale is scored so that the stronger the preference for trying to do an activity, the higher the score. Thus yes and no responses receive the same scale value of 3, uncertain responses receive a 2 and not enough information types of response receive a value of 1. These values are then summed and used in the analysis of variance described earlier. Summed scores can vary from zero (no response whatsoever) to 15. Note the scale is scored so that strength of preference, rather than direction of preference is the important factor (i.e., yes and no responses while being in opposite directions, represent the same strength of preference and therefore receive the same score).

In addition to the scaled responses, students were encouraged to state reasons for their preferences. These reasons were classified and in conjunction with the scaled responses, were coded and transferred to machine scorable forms. Inter-rater and intra-rater agreement checks were made on the scoring process (See results section).

There were 3 other questions included in the "What Do You Like" instrument. The questions were open-ended and asked the students about the experiences one should have before deciding on a job, the types of things that one should consider before taking a job, etc. The responses were classified and scored. Due to difficulties in scoring these questions, results will not be presented in this report.

3. Student Post Module Questionnaire - What Do You Think? (Appendix C)

This questionnaire was administered to students after they had completed the module and the module posttest. This instrument was administered only to the students who participated in the module. The content of the questionnaire related directly to student perceptions of the module. The first twenty questions are in a scaled

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format. Questions in this set relate to a student's perception of the clarity of directions, the extent to which the module interested him/her, etc. For analysis and use, the results will be grouped and descriptively reported by the subject area to which they pertain. Other questions in the questionnaire deal with parts of the module the student liked best, parts he/she liked least, role(s) played in the simulation, etc. These questions will be descriptively summarized and included in the Reviser's Information Summary.

4. Teacher Evaluation Log (Appendix D)

The Teacher Evaluation Log consists of five instruments packaged in one booklet and an additional instrument to be used after the module was completed. The sixth instrument is entitled "General Module Evaluation." The instrument order within the log parallels the ordering of the module. In other words, after students had completed the Introduction to Simulation, teachers would fill in the questionnaire regarding that part of the module. After students had completed the preview, teachers would fill in the questionnaire pertaining to the preview and so on. Below is an instrument by instrument description of the five instruments contained in the log.

FIGURE 2. LISTING AND DESCRIPTION OF THE TEACHER LOG

No.	Questionnaire	General Description
I.	Introduction to Simulation	What materials were used; effectiveness in terms of student understanding and interest, technical quality, suggestions, etc.
II.	Module Preview	What materials were used, effectiveness in terms of student motivation, technical quality, etc.
III.	Preparation Phase	Similar to above questionnaires with the addition of questions regarding integration or fit with the rest of the module and questions pertaining to the role selection process.
IV.	Participation Phase	A questionnaire similar to a daily log wherein teachers primarily identified student and teacher problems in getting tasks done.
V.	Summary Phase	Questions relating to the summary in terms of it being a reasonable culminating activity, etc.

The General Module Evaluation questionnaire solicited teacher opinions of the module as a single entity through questions related to the overall adequacy of materials, the sequencing of materials, module implementation, student participation and learning, and recommendations. The first several pages of the questionnaire dealt with teacher and student background.

5. Teacher Post Module Panel Review

After a module was completed, the teachers who had participated in the pilot test were convened to discuss the module. Per each individual section of a module, teachers were asked about: the particular strengths of that section; the weaknesses; classroom solutions they used to overcome weaknesses; and what recommendations or suggested changes they had for revising the module. Emphasis during the review was placed upon probing into their perceptions of the module and looking for consensus among the teachers.

A. 1. Knowledge Test - Internal Consistency

Internal Consistency (K.R. #21)
By Total Groups and Testing Time
For Total 42 Item Test

Testing Time / Group	Pretest	n	Posttest	n
Total Experimental Group	0.60	50	0.58	50
Total Control	0.73	42	0.82	42
Total (Exp. and Cont.) Group	0.67	92	0.77	92

Interpretation/Comments

As indicated by the table, the knowledge test is moderately reliable. In some instances (the total group posttest and the control group posttest) the reliability is quite high. For the total group posttest this result was anticipated since the group was heterogeneous, containing students with widely differing understandings of the occupational content of the construction module. Hence the test items did discriminate or measure that difference in knowledge. For the control group the high reliability is probably an indication of the wide range of students that participated in the testing.

The reliability coefficient for posttest of the experimental group is somewhat less than that of the pretest. One plausible interpretation of this result is that the mutual understandings gained by the experimental group may have reduced variability within the group. This, in turn, would have an effect on the obtained reliability. The reviser should note that this is but one of several possible interpretations for this result.

A. 2. Knowledge Test - Validity

See Reliability Table for upward bounds or estimates of potential validity coefficients. (These would be equivalent to the square root of the reliability coefficients.)

Interpretation/Comments

Although no direct attempt was made to develop strategies or methods for determining validity, certain factors which would contribute to test validity should be kept in mind. First, in test development, care was taken to eliminate items which were not occupationally oriented. Items dealing with trivial detail were omitted. Secondly, several individuals reviewed the drafts and final version of the test. The test was considered to have reasonable face validity.

Other types of validity such as predictive, concurrent, construct, etc., were beyond the scope of this pilot test. For example, if a factor analytic study was attempted in order to determine construct validity, the values derived would be questionable with the sample size used in the pilot test.

A. 3. Knowledge Test - Total Score Results

Group Means and Standard
Errors By Total Groups and
Testing Time for Total 42 Item Test

Testing Time / Group	Pretest			Posttest		
	Mean	S.E.	N	Mean	S.E.	N
Total Experimental Group	24.3	3.1	50	28.4	3.0	50
Total Control Group	24.8	3.1	42	24.6	3.0	42
Total (Exp. and Cont.) Group	24.5	3.1	92	26.6	3.0	92

Interpretation/Comments

From this table several facts emerge. First there is a sizeable gain in experimental group scores from the pretest to the posttest. The gain of approximately 4.1 points is suggestive of a large module impact or effect on students. Second, the control group experienced a slight pre- to posttest loss (0.2 points) in total test scores. Ordinarily, slight to moderate gains would have been anticipated as a result of the pretesting effect. The loss might have been caused by some students losing interest or "turning off" at having to take the same test twice within a relatively short (3-4 weeks) period of time.

III. RESULTS

A. 4. Knowledge Test - Subtest Results

Subtest Means and Standard Deviations By Total Group and Testing Time

Testing Time		Pretest			Posttest		
Group	Sub Test*	Mean	S.D.	N	Mean	S.D.	N
Total Experimental Group	A	11.3	2.7	50	13.2	2.3	50
	B	4.4	1.5		5.2	1.5	
	C	6.5	1.9		7.3	1.8	
	D	2.1	1.1		2.8	1.1	
Total Control Group	A	12.2	2.7	42	12.2	3.3	42
	B	4.3	1.6		3.9	1.8	
	C	6.3	1.9		6.3	2.4	
	D	2.1	1.2		2.2	1.3	
Total (Exp. and Cont. Group	A	11.7	2.7	92	12.7	2.8	92
	B	4.3	1.6		4.6	1.8	
	C	6.4	1.9		6.8	2.2	
	D	2.1	1.1		2.5	1.3	

*Subtest A = 18 Process Questions
Subtest B = 8 Responsibility Questions
Subtest C = 12 Skills Questions
Subtest D = 4 Environment/Tools Questions

Interpretation/Comments

In Table A-3 the overall gain in knowledge test scores was depicted. In this table (A-4) the scores are partitioned in accordance with the subtests included in the total test. As indicated in the table, most of the pre-posttest gain is found in the experimental group. This gain seems to be evenly distributed across the four subtests included in the knowledge test. In fact, the gain is about the same for each test although the number of items varied considerably, i.e., from 4 items on subtest D to 18 items on subtest A. If the subtests had been evenly balanced with respect to number of questions the results might have been even stronger or more pronounced than the observations made in this pilot test. At any rate, the module delivered cognitive content to students who participated in the module.

III. RESULTS

B. 1. Attitude Scale - Reliability

Inter- and Intra-Coder Percentage Agreement for Randomly Selected* Attitude Scales (Questions 1-8)

Type of Agreement \ Testing Time	Pre	Post
Inter-Coder	80%	79%
Intra-Coder	85%	80%

*n = 21 test booklets randomly selected from the groups tested. Of these, 11 were pretest booklets and 10 were posttest booklets.

Interpretation/Comments

The figures in the table were devised by dividing:

- the total number of times the two coders were in disagreement by the maximum total of responses coded; or
- the total number of times the two codings by one coder were in disagreement by the maximum total of responses coded.

For questions 1-8 on the construction attitude scale there is a high degree of agreement between two independent coders (inter-coder reliability) as well as between two codings by the same coder (intra-coder reliability).

Thus reliability of the scoring for the attitude scale was achieved. Two other important factors should be noted by the reviser/reviewer. They are:

- Reliability of the scale itself has not been measured in that the scale consisted of only a small number of items. Reliability estimates of such a brief scale with a relatively small sample would not be too meaningful;
- In determining the reliability of the codings, the two coders noted that the majority of their disagreements occurred in the scoring of questions 6-8. Due to this observation, these three questions were deleted from further consideration in this report.

B. 2. Attitude Scale - Validity

DATA

NOT

AVAILABLE

Interpretations/Comments

Data regarding the validity of the scale were not collected in the pilot test. The scale, however, was generated by staff members who were familiar with the content and goals of the module or who had actually participated in the writing of the module. The initial draft of the scale was reviewed by the staff and changes were made in accordance with their comments. Thus, a measure of face validity was achieved. (Also see the discussion of the ANOVA results for the attitude scale, Tables G-1 and G-2.)

III. RESULTS

B. 3. Attitude Scale - Preferences

Means (Strength of Preference)*
By Group and Testing Time For
Questions 1-5

Group / Testing Time	Pre	Post
Experimental	11.3	12.2
Control	11.4	11.0

*There were five questions each with a scale value of from zero (no response) to a strong preference value of 3 (yes or no). Hence the scale range is zero to 15 (5 x 3).

Interpretation/Comments

In terms of strength of preference, it is apparent from the table that the module did have some impact on the experimental group of students. On a relatively short scale (see footnote in the left hand column), the experimental group gained nearly a full scale point. Several interpretations of these results are offered below:

- the module has only moderate impact on student preferences and perhaps should be more heavily structured in ways to influence those preferences.
- the scale with only 5 questions was not sensitive enough to change. This becomes readily observable in analysis of variance for this data set.
- the module influenced other attitudinal variables not measured with the present instrumentation.

The control group, in this instance, experienced a slight pre-posttest loss. This is probably attributable to a decrease of interest in taking the same instrument twice within a short (3-4 weeks) period of time.

B. 4. Attitude Scale - Number of Reasons

Means (Number of Reasons)* By Group
And Testing Time For Questions 1-5

Testing Time Group	Pre	Post
Experimental	3.7	4.2
Control	3.9	3.7

*Students were requested to state the reasons for their preference choice. The numbers in the table represent the mean number of reasons given for the first five questions for a group.

Interpretation/Comments

The only change indicated in the table is that the experimental group gave approximately one-half more reason per five questions on the posttest than it did on the pretest. The analysis of variance conducted (see Table G.2.) shows that the F ratio obtained is insignificant.

While on intitial inspection the .5 change may seem large, it must be remembered that across 5 questions a half a reason change is really not that much of a difference. Several possible explanations of the table are offered below:

- the module had some but not much impact on students' statements of reasons;
- the use of number of reasons may not be the most sensitive measure of impact of the module.

These explanations are but two of many possible ones. The reviser and evaluator are reminded to keep that fact in mind.

B. 5. Attitude Scale - Type of Reason

Type* of First Reason Given By Group and Testing Time For The First Five Questions

Group \ Testing Time	Reason	Freq.	% **	Freq.	%**
Experimental	1	61	41	77	44
	2	7	5	20	12
	3	3	2	1	1
	4	20	13	41	24
	5	47	32	18	10
	6	11	7	10	6
	7	--	--	7	4
Control	1	5	38	57	42
	2	4	3	1	1
	3	6	4	1	1
	4	33	23	36	27
	5	30	21	21	16
	6	10	7	11	8
	7	6	4	8	6

*Reasons were classified into seven basic types. These are:

1 = liking or enjoying
2 = past experience
3 = financial reasons
4 = interest/ability
5 = ignorance of the occupation
6 = undecided
7 = other reasons

**Frequency in row divided by total frequency in respective column, multiplied by 100.

Interpretation/Comments

Several factors are readily apparent from the table. First, there is pre-posttest shifting of categories of response. For example, on a percentage basis the experimental group shows relatively large shifts of response from the pre- to the posttest for reasons 2, 4, and 5. The control group experienced only small changes for these same reasons. Some fluctuation is to be expected as is observed with the control group, but undoubtedly a portion of the change in the experimental group is attributable to the module. This becomes clearer when the table is examined in greater detail:

- Reason 5 is ignorance of the job and 22% fewer experimental students used this as a reason on the posttest than did on the pretest;
- Reasons 2 (past experience) and 4 (interest and ability) were used much more frequently on the posttest by the experimental group students than on the pretest.

Secondly, more experimental group students responded on the posttest than did on the pretest (174 to 149). The control group experienced a very slight loss of response (144 to 139). The module may have triggered some interest in responding.

Another factor is observed when this table and Tables G1-G2 are looked at jointly. In Tables G1-G2 ratios considerably greater than 1.00 were obtained although they were of insufficien size to produce a statistically significant value with the rather limited degrees of freedom for these specific F tests. But the three tables considered side by side do tend to suggest that the module was having an impact on student attitudes.

B. 5. (continued)

Lastly, one factor that is puzzling and difficult to explain is the rather large number of responses in reason four for the pretest of the control group. One possible explanation for this occurrence is that the control group contained a fair number of students knowledgeable about the construction industry. This knowledge and perhaps the past experiences that may have accompanied it led to the high frequency of reason four responses.

C. 1 - Student Questionnaire - Reliability and Validity

DATA

NOT

AVAILABLE

Interpretation/Comments

The Student Questionnaire was administered to experimental group students after they had completed the module. Since there was only one test administration, the use of a test-retest coefficient was not possible. Furthermore, the questionnaire consists of many different types of questions (including open-ended questions) regarding various aspects of the simulation experience. The meaning of internal consistency coefficients calculated for this type of instrument would be extremely questionable and hence they were not utilized. Validity was basically ascertained by having the writers of the simulation review the instruments and by incorporating their comments and suggestions into the final form. In terms of face validity the instrument was judged to be a reasonable means of assessing the student's perspectives of the module. Secondly, comparisons between subsets of questionnaire items and achievement test data do tend to support the conclusion that the instrument is at least partially valid. As a group, students did well on the achievement tests and reported that the module did answer questions they had about jobs and did provide much information about jobs.

Table C. 1. (continued)

The reviser and evaluator should also keep in mind one other important fact about the student questionnaire. The questionnaire was not designed to evaluate students but as a means for students to provide the project staff with their opinions of the module as well as their suggestions for revision. Students were informed about the use of the questionnaire. It was hoped that their responses would be open and honest.

C. 2. Student Questionnaire - Results From Questions Dealing With Perception of Learning

Question Dealing With Perceptions About Learning by Response Category in Frequencies and Row Percentages*

Question \ Response Category	Positive	Uncertain	Negative	No Answer
1. I learned quite a bit about jobs from the simulation	27(68%)	10(25%)	2(5%)	1(2%)
2. I learned quite a bit about how to work with other people from the simulation.	25(62%)	8(20%)	7(18%)	-
7. The simulations helped to answer some of the questions I have about jobs.	27(68%)	5(12%)	8(20%)	-

*n = 40

Interpretation/Comments

Across the three questions 79 or 66% of the total responses (n = 120) were in the positive category, 23 or 19% in the uncertain category, and 17 or 14% in the negative category. The trend of student responses is obviously strongly positive.* The students felt that the module provided them with a great deal of information about jobs and how to work with other people, and helped to answer some of the questions they had about jobs. This result is corroborated by the achievement test results which indicate a 4.1 point gain in knowledge. Care should be taken that this salient strength of the module in terms of learning is retained through revision.

*A chi square statistic could be computed for the data, but the trend is so apparent that to do so seems superfluous.

C. 3. Student Questionnaire - Results from Questions Dealing With Overall Perceptions of the Module

Questions Dealing With Overall Perceptions of the Module By Response Category, Frequencies and Row Percentages*

Response Category Questions	Positive**	Uncertain	Negative	No Answer
3. The simulation was boring	22(55%)	10(25%)	8(20%)	-
4. Would recommend simulation to friends	16(40%)	13(32%)	9(22%)	2(5%)
5. Would like to go through more simulations	19(48%)	11(28%)	9(22%)	1(2%)
6. Would rather do something else with this time.	21(52%)	11(28%)	7(18%)	1(2%)

Interpretation/Comments

Across the eight questions 144 or 45% of the total possible responses (n = 320) fell into the positive category, compared with 84 (26%) in the uncertain category and 83 (26%) in the negative category. In general the module was well received by students. Clear majority statements emerge on questions 3, 6, and 12, indicating that students did not find the simulation boring, would not rather have done something else with time, and enjoyed interaction with other students. Forty-eight percent of the students would like to go through more simulations.

Students were more divided in their opinion about the length of the module. As questions 8 and 9 show, 42 and 45% of the students felt that the simulation was too long with the remainder (a majority) being uncertain (25%) or feeling that it was too short (28%).

Note that the wording on question 15 may have

(Continued on next page)

Table C. 3. (Continued)

8. Simulation took too long.	17(42%)	10(25%)	11(28%)	2(5%)
9. Simulation was over too soon.	11(28%)	10(25%)	18(45%)	1(2%)
12. Enjoyed working with others	23(58%)	10(25%)	6(15%)	1(2%)
15. Simulation was a good way of getting out of class.	15(38%)	9(22%)	15(38%)	1(2%)

*n = 40

**For questions with negative stems, disagreement with the stem constitutes a positive reaction to the module and is entered in the positive category on the table. This fact should be kept in mind when reviewing the table.

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made it difficult for students to correctly identify how they wanted to respond to the question.

C. 4. Student Questionnaire - Results from Questions Dealing With Specific Module Parts

Questions dealing with Specific Module Parts by Response Category in Frequencies and Row Percentages*

Response Category Question	Positive**	Uncertain	Negative	No Answer
10. Tasks too complicated or hard	18(45%)	11(28%)	9(22%)	2(5%)
11. Summary helped pull things together	12(30%)	15(38%)	12(30%)	1(2%)
13. Activities were exciting to me.	14(35%)	13(32%)	12(30%)	1(2%)
14. Had trouble knowing what to do next	9(22%)	7(18%)	23(58%)	1(2%)

Interpretation/Comments

Across the entire set of questions 152 or 42% of the total number of responses (n = 360) fall into the positive category, compared to 101 (28%) in the uncertain category and 96 (27%) in the negative category. This is a positive reaction overall, although less strongly so than shown in Tables C.1 & 2, indicating that there are some minor implementation weaknesses in specific parts of the module.

One of the strengths pointed up by a 68% positive response is the role selection process. A majority of students felt that the pre- and post-tests were not difficult while over forty percent felt that the preview helped to prepare for the simulation, that the simulation parts fit together well, and that the tasks were not too complicated.

The major negative reaction which came through was that students (58%) had trouble knowing what to do next, warranting a careful reworking of directions. The students' opinions on the remaining questions in this grouping were approximately evenly divided.

These results should be studied along with the teacher comments obtained from the panels and logs for further illumination.

(Continued on next page)

Table C. 4. (continued)

16. Too many tests and forms to fill out	16(40%)	11(28%)	12(30%)	1(2%)
17. Pretest and post-test were difficult for me	21(52%)	12(30%)	6(15%)	1(2%)
18. Simulation parts fit together well	17(42%)	11(28%)	10(25%)	2(5%)
19. Preview, etc., helped to prepare me for simulation	18(45%)	14(35%)	7(18%)	1(2%)
20. Liked the way I selected my role(s) in simulation	27(68%)	7(18%)	5(12%)	1(2%)

*n = 40
**For questions with negative stems, disagreement with the stem constitutes a positive reaction to the module and is entered in the positive category on the table.

C. 5. Student Questionnaire - Results From Other Important Questions

Other Important Questions by Response Category in Frequencies and Row Percentages*

Response Category / Question	Yes, All of the Time	Yes, Most of the Time	No, Not Usually	No, Not At All	No Answer
22. Did You perform well in your roles?	3(8%)	32(80%)	3(8%)	-	2(5%)

Response Category / Question	More Interested	No Change	Less Interested	No Answer
28. Did your feelings about planning construction projects change?	19(48%)	13(32%)	4(10%)	4(10%)

Response Category / Question	Yes	No	No Answer
29. Did you discover any new interests ?	16(40%)	21(52%)	3(8%)

*n = 40

Interpretation/Comments

Students responded in a very strongly positive manner that they felt that they performed well in their roles (8% all the time and 80% most of the time). It is probable that this indicates that the students felt reinforced about their abilities as a result.

Forty-eight percent experienced a positive change about work in planning of educational programs. In terms of discovering new interests, two out of five students gave a positive response.

III. RESULTS

C. 6. Student Questionnaire - Collated Open-Ended Responses to Questions #23, #25, #30, and #31.

#23 List a few reasons why you liked or did not like your role (or roles).

I liked the drawing, designing, or making the model (7).

I liked it, it was fun, these were things I like to do (8).

I liked choosing people for jobs (2).

I didn't like it because it was boring, there was nothing to do, the things we did were dumb, or not what I like to do (6).

I didn't know what I was doing, or the directions were all messed up (4).

Single responses:

I had to write too much.

No. Because the teacher was always judging people.

I didn't like it that well but it was the best out of all of them I think.

I liked it because we got to work in groups.

Because it was simple, and not much work involved.

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#23 (continued)

I did not like doing everyone's work!

It gave me a chance to decide on some things.

Because it gave you the actual experience.

(No response = 7)

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#25. Describe the one thing which you feel you did best in the simulation and the one thing you did least well. Be sure to say why you did well or poorly.

Best Thing	Reasons	Worst Thing	Reasons
choose people	like it	painting	haven't got a steady hand
holding meetings and organizing	don't know	building	not given enough time
everything	because I did my own plus everyone else's work!	getting into it	I could have dropped out
draftsman	fun	civil engineer	boring
painted the project	because it was the easiest	fill out a sheet	I didn't know how to fill it out.
helping the architect	because it was fun	messed up on the assignments	
drawing the house	because I did good	filling some of the charts	it was hard
drew plans	I made sure	don't know	
drawing	I like to draw		
finding a plot	It was easy	building	it was too long
writing, drawing	I did it most		
help make the model	it's not hard	fill out forms	too hard
1A	it had the best instructions	model	not enough time or materials
helping people	because they needed help and I always helped them	building facility	didn't have enough time to build it
tests	understood them	building project	none
drawing	I like to	meeting deadlines	I'm slow

#25 (Continued)

Best Thing	Reasons	Worst Thing	Reasons
designing	I like doing it	tests	kind of hard to understand
made plans	I had helped	putting it together	there were too many people
plot in 3-D	It was fun and I thought it was good	filling out papers	I didn't enjoy it too much
picking architect	picked best one	building plot	didn't get to do much
drawings	I liked them	on the final board	I think I could have done a lot better
picking the principal architect	because I asked a lot of questions		
layed out sketches	I worked hard and well	worked on project	I feel that it could have looked better
sketch site	I did it all	painted	only one thing
floor plan and building	I got to draw and build	meetings	I'm no good at it
build	fun	work	not fun
sketches	I like to draw	summary	I don't like to write
drew a storage shed, helping others	she asked me to and I wanted to	nothing	nothing
floor plan	I did great!		
helped	because I want to get good grades	did nothing	did not understand
listened to others	nailing	building facility	didn't know what we were doing
choosing the sites	I don't know	building model	I am not very good at stuff like that

(No Response = 8)

30. Name some of the things you liked most about the simulation and some of things you liked least about the simulation.

Liked Most	Liked Least
making the board making sketches	
working with other people	disorderly people
painting, sketching	filling out forms, reading
drawing, building, planning, supervising	meetings
building, meetings, talking, fun	working
sketching, TV	summary, groups
drawing, helping others	having meetings
designing the model, designing the building	
drawing the house	drawing the boundary
don't know	drawing plans
the drawing and making of the board	the order
finding the plot	sketching, writing all the stuff
	the people that try to run it and the teacher that helps try to run it. They should have everybody equally running it.
making the models	filling out forms
the first part	model
making precise drawings	trying to figure out what to do next
drawing the floor plan, meetings	
making the drawing for the plot in 3-D	filling out papers and reading so many booklets
picking architect, watching the film, listening to talking pages	pretest, building, and meeting

30. (continued)

Liked Most	Liked Least
plans, the model	all the work, sheets, book, etc.
drawing	reading
the job I had, the building, the drawing, the sketching	reading, test, watching film strips
being able to help the Board of Education and working with them	filling out forms - calling meetings
Board of Education Superintendent	community representative - principal architect - draftsman
working in groups or in other words having the meetings - being able to understand some of it. (the checks)	talking pages - drawing the sketches of the building and being the only P.A.
	doing everyone's work!
meeting with others, helping people playing the roles	building facility, filling out papers, taking tests
most everything	building
working with others, drawing, find information	working alone, there were big spaces in the things we did, and when you got alone, you had to wait until people caught up with you.
nothing	not enough materials, not enough time, not a good instructor
facility	agenda
picking sites filling out forms	building drawing

(No Response = 8)

31. Write down some of your ideas on how the simulation might be made better.

I do not know.

More simulations, longer, more drawing, I guess not as many tests, more making model buildings.

Less writing, more building, less discussion, more working time.

Well, I really don't have any changes right at this very minute, so maybe I can come up with some tonight.

None (4)

If it didn't take as much time. If everyone got together and worked harder it would have got done.

I can't think of any ways to make it better.

Better organization of directions.

Clearer instructions and more materials.

Having everybody doing a good share into it, not only the teachers' pet and the teacher so that way everything will work out.

If it was shorter. Not so many writing projects.

Some of the things are not in order, like we were drawing the building when we did not know what you wanted (in order of buildings.)

Draftsman not having to draw plans.

I thought this simulation was good if you like to do planning construction. If you make kits like this for all jobs, I think that will be great. Don't worry about my answers in here, but I was just being honest. I hope that's what you wanted.

One way it might be better is to not having us read so many booklets and try to cut it down so it's shorter.

Have more time, and have the materials come with the set.

Have the teacher understand more about it.

If it was a little shorter.

It could last longer.

Have more time to work on some things. Have better roles for people. Having equipment for facility. Have more cooperation in the groups. Have the simulation speak about and tell you about something you don't understand.

31. (continued)

Have little groups to work with. Have more time for each step. Have better materials for the model.

More interesting subjects. More detailed books. More exciting - not so dull.

Maybe not having so many forms, and not as many booklets to read.

Maybe you could make it a little more interesting and exciting.

Not so many booklets and forms and papers and things to read. Make it less complicated to understand.

Get a better teacher to teach this. I mean the regular teacher Miss Miller she made things 100% worse than they had to be !! Write more explanations in your booklets !!

Not so many steps. More time. Some of the equipment for the building of the model. The directions a little less complicated (not that they were really that complicated, I just got kind of confused sometimes and I know I wasn't the only one).

Not so many tests, and not so much reading.

I don't know how, but in some places it is real boring.

By having more activities involved.

(No response = 8)

D. 1. Teacher Log and General Module Evaluation - Reliability and Validity

DATA NOT AVAILABLE

Interpretation/Comments

The Teacher Log and General Module Evaluation is a set of six questionnaires completed by teachers as they observed students progressing through a module. The questionnaires varied considerably depending on the part of the module the teacher was to evaluate. Space was provided for teachers to supply comments about the materials and to make recommendations for change. The variable nature of the question format and the question content make it difficult to determine the reliability of the questionnaires. Further, even if a reliability coefficient could be calculated, the small sample size (n = 4 experimental teachers) would render the coefficients meaningless.

Validity was determined by having product developers review the Teacher Log and General Module Evaluation. The developers considered the instrument to be a viable means of collecting teacher observations especially with regard to problems incurred in implementing the module. Face validity seemed high. The developers did have some question about overall length of the questionnaire. (See Table III - D. II.)

III. RESULTS

D. II **Teacher Log and General Module Evaluation** -

Composite Results

COMPOSITE RESULTS AVAILABLE UPON REQUEST FROM THE OCCUPATIONAL EXPLORATION PROJECT EVALUATION STAFF

Interpretation/Comments

Due to the extensive length of the questionnaires, tables will not be included in this report. A composite set of teacher responses on the Teacher Log (5 individual questionnaires) and the General Module Evaluation will be maintained by OEP evaluation staff. These composite responses will be available upon request.

Several factors should be kept in mind when reviewing the composite results. First there were only 4 teachers who were facilitating or managing experimental group experiences. In many cases only two or three teachers responded to a question. Second, teachers, on several instances, commented about the length of the Log; hence length probably influenced response frequency. Third, favorable teacher comments were heard regarding the General Module Evaluation. Apparently, from the perspective of teachers, this instrument was of better quality than the other five. Fourth, it would seem that a fair amount of faith can be placed on the truthfulness of teacher responses. The questionnaires were designed to evaluate the program not to evaluate teachers. Teachers were informed on several occasions of the intent of the instrument package.

Lastly, the responses on the instruments were summarized and only the main thoughts or ideas were stated on the Reviser's Information Summary Sheet. These summarizations should be studied with other sources of data in view.

E. 1. Teacher Post Module - Reliability and Panel Review - Validity

DATA

NOT

AVAILABLE

Interpretation/Comments

The panel review procedure and reporting format was generated from similar efforts undertaken for the School Based Component of the Comprehensive Career Education Model (CCEM) in 1973. CCEM project staff felt that panel reviews provided an important source of data for revising curriculum materials. The process is purposely designed as an open-ended one to insure that teachers have the opportunity to freely discuss any concerns or comments they have about the module. Reliability in this instance is difficult to assess. It should be noted, however, that, teachers were frequently asked during the review about the extent to which they agreed upon particular points. Thus, the panel report, in many cases, represents a convergence of teacher perspectives or opinions.

Validity is judged by the degree to which the revisers and evaluators will find the data collected from the panels useful for illuminating strengths and weaknesses within the module and helpful in determining revisions to be made in the module. Validity judgments will have to come sometime after the generation of this report.

Due to the open-ended nature of the panel review, Table III - E-11 is simply a copy of the actual panel review. The report, which is a summary of the panel discussion, was written by OEP staff. **For the Reviser's Information Summary (RIS) the main ideas of the panel review have been abstracted and placed in the appropriate cells of the RIS.**

III. Results*

E. II. Post Module Panel Review

Title of Module: Planning Construction Projects
LEA: Jefferson County, Colorado and Denver, Colorado
Panel Leader: John Radloff
Panelists: Trina Dale - Denver
Barbara Miller, Pauline Rose - Jeff Co
Observer Participants: Sandra Pritz - CVTE
Margaret Erickson - Jeff Co
Dates Panel Met: January 3, 1974
Number of Hours: 4 hours total

*Interpretation has not been provided.

Title	Strengths	Weaknesses	Classroom Solutions	Revision or Suggested Changes
Introduction	- The slides on the slide tape were very good.	- Generally negative reaction. - Did not work without much teacher aid. - Was too fast. - No opportunity to review the ideas. - Students did not understand the term simulation and were not motivated to go on. - Script was too subtle. - Both tape and handbook were necessary rather than being alternatives.	- Used both tape and handbook. - Teachers summarized the ideas and presented them. - One teacher did this and the Preview the same day and felt it helped.	- Slow it down and emphasize the work simulation. - Provide guideline questions at the beginning. - Provide a review at the end. - Slide tape script should be more direct.
Module Preview	- Music good	- Overwhelming and confusing; the students knew only that they'd be able to choose a role. - Students were not motivated to continue (one of the 3 teachers felt less strongly about this than the other 2. One teacher had 3 girls opt out.) - Vocabulary was too difficult, required much explanation. (This was seen as a strength later when, about Handbook 3 the students finally felt comfortable with words they would not have known otherwise.) - The situation was introduced too late and wasn't personalized enough.	- Teacher did much explaining and used both book and mediation.	- Emphasize what is going to happen.

Title	Strengths	Weaknesses	Classroom Solutions	Revision or Suggested Changes
Preview (Continued)		- Too long, too much reading.		- Use a summary at the end.
		- Took too much time to set up audio visual equipment.		- Use stop-action technique with the tape.
				- Get the students into the action sooner to motivate them.
				- Introduce the simulation situation sooner and dramatize it to make it important to the students.
				- shorten it by postponing some of the details
Preparation	- None identified	- The vocabulary was much too difficult so the students would not read the material thoroughly.	- Teachers intervened and explained much of the material.	- Emphasize that the architect is a leadership role in the simulation (one teacher's comment).
		- Lack of clear directions for what to do.		
		- **If a student chose to be the Jr. Architect, the later competition meant nothing.**		- Direct the students on how to trade roles if necessary.
		- Role-choosing process wasn't followed as intended.		- Explain that interests and preferences → priority (perhaps with arrow)
				- Mention that the forms should be kept separate for use at the end of the simulation.

Title	Strengths	Weaknesses	Classroom Solutions	Revision or Suggested Changes
Preparation (Continued)				- Provide specific directions. - List on the envelope each piece included and print PREP at the upper right of each form. - Lower the reading level.
Handbook 1A-Contacting an Architect	- The teachers were unanimously happy with the talking pages.	- Had no impact because of preparation leading another way. - Checks for the architect were never mentioned again. - P. 7 questionnaire skipped entirely by one group.	- None described	- Tell the students when to pay the the architect's installments.
Handbook 1B-Finding Sites	- Students enjoyed it very much.	- **The directions were misunderstood by one group, so that each student was working individually to find all 10 sites.** - Lack of labelling of papers caused some confusion. - One group thought they were supposed to choose the one best site at this point.	- None identified.	- Each students should be directed to put his name on the top of the map and to number the sites. - Underscore that the object is to narrow the choices to 4 sites.
Handbook 2A-Identifying Client's Needs	- Was nice and specific.	- None identified.		
Handbook 2B-Sketching Sites	- Students found it a lot of fun.	- One group used small graph paper and after scaling down to fit the paper, the templates didn't fit.		- Check the scale used on p. 6.

Title	Strengths	Weaknesses	Classroom Solutions	Revision or Suggested Changes
Handbook 3A-Writing Specs	- Slide tape was good and the mess without specs came through well. - Was fun for students. - Demanded detail.	- None identified		
Handbook 3B-Evaluating Sites	- Vocabulary beginning to be understood.	- None identified.		
Handbook 4A-Creating a Design	- Understood what they were to do.	- Some students thought they were to design an entire Phys. Ed. department.	- None identified.	- Clarify that the facility is not to include a gym and classroom
Handbook 4B-Putting the Puzzle Together	- Students enjoyed it.	- Page 2 activity not carefully labelled and little indication given as to who should do it.	- One teacher skipped the activity on page 2.	- Label activities and indicate (where it will stand out) who shall do it. - Early in the handbook the purpose of the activity and the intended product should be indicated.
Handbook 5-Selecting Site and Design	- None mentioned	- Was very quick (perhaps not a weakness). - Agenda not specific enough.	- None mentioned.	- Make agenda more specific.
Handbook 6-Making Final Plans	- "Loved it".	- 6-C - Some trouble with dimensions and scale (4.1 - 4.3).	- 6E - Used whatever materials they had, did not use paper maché, students adapted to their own level.	- 6C - Simplify and explain scale p. 9. Remove change of scale (4.1) if it proves unnecessary after reevaluation.

Title	Strengths	Weaknesses	Classroom Solutions	Revision or Suggested Changes
Handbook 6-(Continued)		- 6D - Too much drawing along with earlier drawing assignments. - 6E - Video tape inconvenient and expensive. No indication of when to show videotape. Didn't find all materials called for. Didn't realize they'd need aerial photos again.		- 6D - Perhaps he could trace or use an earlier drawing. - 6E - Note that aerial photographs will be needed again here (whenever they're used). Use a super slide tape instead of video tape. Indicate at the beginning that video tape should be shown.
Handbook 7-Presenting Plans	- None mentioned.	- Anticlimactic and short (10-20 minutes). - Page 4, only one of two models unveiled. - No real audience since the students all worked on the model.	- Used both models.	- Consider adding this activity to previous lesson. - Use both plot model and facility model. - Invite someone to the unveiling (principal, guidance counselors).
Summary	- Task 1	- Task 2 (nothing with which to compare their experiences).	- Did not spend two periods on it.	- Drop Task 2. - Consider having a group discussion.

Comments Across Entire Unit

--First page of each handbook should be explained as an overview and an important first step before proceeding with the rest of the material. Simplify the headings so that they are descriptive:

Here's what you'll do
whom you'll do it with
how long you have to do it
what you need to do it
where you can get the information

Shading on the schematic is so dark that some students thought they were not to do that activity.

--There was strong agreement that the module should be packaged by role rather than task and the number of separate pieces should be greatly reduced.

--More directions on what to do next are needed.

--One teacher did not follow the time schedule but felt it would have been better to have done so. It was suggested that a time sheet be included for the students to check off their own time blocks and deadlines met.

--One teacher felt that the story example was totally unnecessary and simply made for more reading. All agreed that it was too wordy and that the characters were not well enough identified by role. One suggestion was to keep the story separate and at the back of the handbook so that it could be tapped as a clarifying example.

--Check to see if all sketches are necessary and indicate which ones need to be drawn to scale and which can be traced.

--There was a general feeling that two people playing the same role tends not to work, as one tends to take over.

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F. Knowledge Test - Analysis of Variance For Total Test Scores

SUMMARY TABLE*

SOURCE	df	SS	MS	F
Between Subjects	91			
Between Classes	7			
A	1	309.1	309.1	7.5
B	1	749.8	749.8	18.3**
AB	1	292.2	292.2	7.1
C/AB	4	164.2	41.1	1.2
Within Classes	84			
E/C/AB	84	2956.1	35.2	
Within Subjects	92			
D	1	91.9	91.9	7.3
AD	1	195.3	195.3	15.5 **
BD	1	38.7	38.7	3.1
ABD	1	3.4	3.4	.3
CD/AB	4	50.3	12.6	.6
ED/C/AB	84	1679.8	20.0	
TOTAL	183	6530.6		

*Where

A = Treatment (experimental vs. control)
B = Schools (Denver vs. Jeff Co.)
C = Classrooms (N = 8)
D = Testing (Pre vs. Post)
E = Students

**$p \leq .05$

Interpretation/Comments

As described earlier in the text of this report the key term to be observed in the anclysis is the AD interaction. If AD interaction occurs and it occurs in such a manner that the experimental group shows high posttest gains, then most likely the module had an impact on student career knowledge in this particular field. Tables A. 3 and A. 4 confirm in a descriptive fashion that the interaction did take place as expected. Table F. indicates that the interaction is statistically significant at the .05 level. Indeed, there is conclusive evidence to demonstrate the effect of the simulation.

There are other terms in the table that are significant. This was anticipated as a possibility in setting up the design and in no way detracts from the significant difference obtained in the major area of concern.

G. 1 Attitude Scale - Analysis of Variance For Strength of Preference Scores (Questions 1-5)

SUMMARY TABLE*

SOURCE	df	SS	MS	F
Between Subjects	90			
Between Classes	7			
A	1	10.4	10.4	1.7
B	1	5.3	5.3	.9
AB	1	.1	.1	0.0
C/AB	4	23.9	6.0	.8
Within Classes	83			
E/C/AB	83	604.6	7.3	
Within Subjects	91			
D	1	3.4	3.4	.5
AD	1	17.2	17.2	2.3
BD	1	3.6	3.6	.5
ABD	1	.5	.5	.1
CD/AB	4	30.6	7.7	1.9
ED/C/AB	83			
TOTAL	181	1028.9		

*See Footnotes in Table F.

Interpretation/Comments

An examination of Table G. 1 reveals that while no significant AD interaction was achieved, the F ratio actually obtained is moderately large in view of the respective degrees of freedom for this specific F test. This factor in conjunction with other additional data collected for the construction module tends to suggest the following conclusions:

- the module was having an impact on student attitudes but not an excessively large one; and
- the limited time allotted for testing and the trial nature of the attitude scale may have precluded the complete measurement of the attitudinal effect.

Note that the above conclusions are several from the many that could have been posited. Other interpretations are plausible and should be considered by the reviser and/or reviewer.

G. 2 Attitude Scale - Analysis of Variance For Number of Reasons

SUMMARY TABLE*

SOURCE	df	SS	MS	F
Between Subjects	90			
Between Classes	7			
A	1	.6	.6	.1
B	1	.9	.9	.1
AB	1	.4	.4	0.0
C/AB	4	41.3	10.3	1.9
Within Classes	83			
E/C/AB	83	459.2	5.5	
Within Subjects	91			
D	1	.6	.7	.2
AD	1	5.2	5.2	1.6
BD	1	0.0	0.0	0.0
ABD	1	1.2	1.2	.4
CD/AB	4	3.5	.9	.3
ED/C/AB	83	267.0	3.2	
TOTAL	181	779.7		

*See Footnotes in Table F.

Interpretation/Comments

As described earlier in the text of this report the key term to be observed in the analysis is the AD interaction. If AD interaction occurs in such a manner that the experimental group shows high post-test gains, then most likely the module had an impact on the number of reasons students gave for supporting a preference.

Results in Tables B. 3 - B. 5, presented previously in this report, indicate that the module was having some impact on student attitudes. In this Table, G. 2., the AD interaction that did occur was not of sufficient magnitude to produce a statistically significant result. The result, however, is in line with general trend of data reported in Tables B. 3 - B. 5.

IV. Reviser's Information Summary (RIS)

A. Description of the Summary

The Reviser's Information Summary was developed for the purpose of assisting revisers to assimilate information collected during the pilot test of a module. To accomplish this, information from each source available was first reviewed and then only major thrusts or ideas from the source were summarized. (These key thrusts or ideas were determined by the judgment of the authors of this evaluation report.) The summary was then transferred to the appropriate location on the large sheets which constitute the RIS. Lastly, each column was studied and trends were drawn and so recorded at the bottom of the sheet. In ascertaining trends the authors used their familiarity with data, the module, and the data collected.

In general there will be one Reviser's Information Summary sheet per part of the module and one-two sheets covering the overall nature of the module. On sheets which pertain to module parts, only some of the data sources provided information pertinent to that part. Hence, the sheets do have some blanks or missing data cells. The reviser should exercise extreme care in interpreting the information on the sheets and should always keep in mind that comments on the sheets represent only a summary of key points. In addition, it sometimes was most difficult to determine a trend in the information obtained.

B. Use of the RIS

One way the reviser might use the RIS is as follows:

1. Read the module - become thoroughly familiar with it;
2. Read the first part of this report (Sections I and II) thoroughly. Skim the results compiled in tables (Section III, parts A, B, C, D, and E.) Read section E-2, the teacher panel review report, closely;

3. Read and study the Reviser's Information Summary. (Consult original data sources, if necessary.); and

4. Generate a set of revision specifications based upon knowledge of the module, the Reviser's Information Summary, project developmental criteria and other information, if appropriate.

C. REVISER'S INFORMATION SUMMARY

Construction: Ov

DATA SOURCE	STRENGTHS	WEAKNE
STUDENT TESTS	On a reliable 42 item knowledge test, experimental group students gained approximately 4 points per student from the pre- to the posttest (24.3 to 28.4). The scores of control group students remained basically the same on the two testings. The gain was evenly distributed across subtest scales. On a reliably scored attitude scale, the experimental group experienced positive change but **it was** of insufficient magnitude to produce statistically significant results. (The brevity of the scale may have precluded measurement of the full module impact.) The reviser might refer to Table B. 5. in which positive changes in student reasons for preferences are given. The experimental group were definitely shifting in their responses, a result which is attributed to their participation in the module.(Also see tables B. 3. and B. 4. for other attitudinal effects.)	Minor weaknesses observed here may it was difficult to determine if d gains had occurred in the experime available for testing as well as t scale may have dampened the opport tudinal impact of the module.
STUDENT QUESTIONNAIRES	Students gave strong positive response (68%) to the job information they got from the simulation. They found it interesting (55%) enjoyed interacting with other students, (58%), and would like to do another (48%). Over 40% had positive attitude changes in interests or attitudes toward work in construction. Students were enthusiastic about the role selection process (68%), with a majority feeling that the pre- and posttests were not difficult. Over 40% felt that the preview helped to prepare for the simulation, that the parts fit together well, and that the tasks were not too complicated. The favorite activities were drawing, designing, and interaction with others, although this may reflect individual differences rather than module quality. Eight-eight percent felt that they had performed well in their roles at least most of the time.	Students were divided in their opi module with substantial number (42- A majority of the students (58%) fe be better. (Knowing what to do ne The least favored activities (ment meetings, filling out forms, drawi may reflect individual differences

all Considerations ES	RECOMMENDATIONS FOR REVISION
elate to the tests. They are: ferential subtest knowledge al group; the limited time brevity of the attitudinal ity to observe the full atti-	
n about the length of the %) feeling that it was too long. that the instructions should) ed more than once) were and reading, although this ther than module quality.	Student comments for revision recommendations include: better instructions, less reading and writing to do, more time, less time, fewer tests, and a more exciting unit.

Construction: Ov

DATA SOURCE	STRENGTHS	WEAK
TEACHER LOGS	1. The students were generally receptive to the module, especially when they got into the "construction phase" and became involved in their role-playing. Two teachers felt it was exciting for their students. 2. Two teachers felt that the module built decision-making and/or group discussion abilities. 3. There were varied, but positive, responses about how much the students learned about the module content (very much, much, an average amount). 4. One teacher commented that she had learned more about her students and that the classroom had become more informal. 5. One teacher saw positive changes in student interaction, with students consulting with each other who had not previously done so. 6. The films and talking pages were good for the non-readers. 7. All of the teachers rated the quality of the module high and felt that they would use it again and recommend it to others.	1. Three of the four teachers exper students finishing earlier than nate them, and one teacher felt t boss concept" is not yet develope 2. The vocabulary was too advanced, progress with it. 3. The students who found the module others did the work for them. 4. It takes pushing, especially for with little self-discipline. 5. The slower kids may have used the getting out of working. They wat seem to absorb much.
TEACHER PANELS		1. Story example was felt by one te 2. All teachers felt that the story not well enough identified by rol 3. With two people playing the same
TRENDS	1. Clearly the module was delivering job information as indicated by student test scores, student questionnaires, and teacher observations. 2. Additionally, student attitudes were changing in accord with participation in the module. Students were interested in and enjoyed the module. 3. Student reception of the module was highest when they were most involved in an active manner in the simulation. See specific RIS sheets such as the one for Task 6. 4. Teachers were quite positive about overall module quality and that some of the materials were good for non-readers. (Although there are some problems in using the module with special groups of students.) 5. There were various side benefits from the module: - growth in student decision making abilities and group discussion skills; - the classroom may be becoming more informal in nature; - students' interaction seemed to improve; and - student enthusiasm seemed to be high.	1. Major problems emerged in the sim tion and management of activities always sure of what to do next, i clear, coordination of the rate a proved to be difficult, at times ficulty in the module, etc. Many specific RIS sheets. 2. In accord with the Weakness #1, t specific RIS sheets regarding the as well as time allotments for in should carefully reexamine the re ty with a view toward possibly sh 3. Comments from teacher panels tend situation (i.e., the story exampl teacher wanted it completely drop being poorly characterized. 4. The problem of vocabulary as cite has to be attended to. (Note as seem to learn the vocabulary.) 5. Apparently, some students (perha ers) tend to let others do their even be using media viewing as a pation in the module activities.

rall Considerations SSES	RECOMMENDATIONS FOR REVISION
nced some difficulty with some hers. It was hard to coordi- at this was because the "leader- . lthough the students made some ifficult were bored because on-achieving students or those udio-visuals as a means of ned others work but didn't	1. Delete redrawing of the same material in the later tasks. 2. Delete some meetings. 3. Change the vocabulary or aim at a higher grade level. 4. Building the facility was fun but time-consuming. Perhaps pre-cut cardboard model kits could be used. 5. One teacher commented that names in the booklet were confusing; people could be labelled by role title. 6. Teachers need to get better acquainted with the materials, perhaps by simulating themselves.
er to be unnecessary. s too wordy and the characters le, one tended to take over.	1. Emphasize the importance of the first page of each handbook as an overview and make the headings simpler and more descriptive. 2. Lighten the shading on the schematic so the students won't think it's blacked out. 3. Package the module by role and reduce the number of pieces. 4. More directions are needed. 5. Include a time sheet for students to check off. 6. Keep the story example separate, to be tapped as a clarifying example. 7. Reduce the amount of drawing. 8. One teacher felt the unit should be more teacher directed.
ation with regard to organiza- For example, students were not tructions were not always which students finished tasks udent leadership may be a dif- ore examples are found on many comments were recorded on verall length of the simulation vidual activities. The reviser tive importance of each activi- tening the module. o indicate that the problem was not well received. One d, whereas others saw it as several times in RIS sheets dule progressed, students did slower students or non-achiev- k for them. Some students may vice to avoid **active** partici-	With the fact in mind that the module was successful, nevertheless there are problems that should be attended to and some revisions are indicated. Besides trends below, see specific RIS sheets. 1. There are major problems with organization of the module. For some tasks the time allotment was not sufficient. For others, the task itself was questionable in terms of its value and relation to other parts of the module. For example, the problem situation itself was questioned, Task 7 was found wanting, etc. In some cases the time allotment might have been seen as more adequate if directions were clearer and if the module had been packaged more simply (fewer pieces with perhaps, highlighted directions). Time may have been wasted in these areas. 2. Time might also be saved by considering the use of an option suc as pre-cut cardboard model kits. Perhaps time was also used in excessively redrawing designs. (Although this may be a realistic aspect of work in the field.) 3. Students indicated that they would like less reading and writing. In this regard, careful examination of all media should be considered and attention should be paid to the best way to deliver a concept (either booklet or media). 4. There should be provisions for better familiarizing the teachers with modules of this type given their complexity. The teacher's role in the module should be examined and possibly expanded. 5. Vocabulary problems may be handled in a variety of ways. A few possible ideas are offered as follows: include a glossary; define more carefully as words are used in the test; Alert students early to the fact that they will learn vocabulary as they go along so that they won't become discouraged or lose interest.

DATA SOURCE	STRENGTHS	WEAKNESS
STUDENT TESTS	________________	________________
STUDENT QUESTION-NAIRES	From an incremental test* done in the Fall of 1973 the following results were obtained: 87% (n = 15) or more of the students using the materials felt that they understood the materials and that the vocabulary was easy to understand. *test data was collected from students in Upper Arlington, Ohio	When students were questioned with re ment of the introduction, the quality picture became somewhat more mixed in - Only 53% of the students were fi ing the booklet or the slides. - Only about 1/3 of the students we of liking the illustrations.
TEACHER LOGS	The slides were rated high in quality.	1. The students in all four classes the concepts presented, partly du the speed with which ideas were 2. The booklet was rated poor to goo it is too technical and detailed, 3. It was necessary to use both the each other.
TEACHER PANELS	The slides on the slide tape were very good.	1. Generally negative reaction, didn aid. 2. Too fast, no chance to review ide 3. Term "simulation" not understood, script too subtle.
TRENDS	1. Teachers were consistent in their comments about the high quality of the slides. 2. Comments collected from tests of these materials in other settings indicate that students were able to generally understand the concepts presented in the materials. (However, there are some problems with the materials as indicated in the next column.)	With regard to data collected from th Module and from other uses of these m encies and inconsistencies emerge. Consistencies: 1. Key ideas are not repeated often in for reviewing the important co presented too quickly. 2. The introduction is not motivatin this may have been partially caus standing of the concepts presente term, "simulation".) Inconsistencies: 1. Students who used the materials i ule apparently had more difficult This may have been caused by the concepts presented. 2. There were varying perceptions of materials. For example, in const poor to good rating whereas in th as being very good.

ES	RECOMMENDATIONS FOR REVISION
gard to their overall enjoy- of the materials, etc., the nature. in their statement of enjoy- re strongly positive in terms	Slightly over one-half of the students recommended that the slides and booklet be used together, with the slides coming first.
were unable to fully understand to the vocabulary level and ntroduced. with comments indicating that dry and dull. slides and booklet to reinforce	1. Direct teachers to use slides first for visualization, then reinforce with a simplified form of the booklet. 2. Use color in the booklet.
t work without much teacher s. therefore not motivational;	1. Provide guideline questions at beginning, review at end. 2. Slow it down, explain simulation more directly. 3. Use both tape and handbook for reinforcement.
test of the Construction terials the following consist- nd/or no opportunity is built cepts. Ideas may also be students (in construction, d by lack of student under- , especially with regard to the the context of an entire mod- understanding the materials. ecessity for them to apply the the technical quality of the uction the booklet received a education module it was rated	1. Repeat key ideas more often, provide opportunities for review or for students to become more involved, and slow down the presentation. (Perhaps this will solve the motivation problem.) 2. Special attention should be paid to the manner in which the concept, simulation, is introduced. It, perhaps, should be more explicit. 3. Re-examine **drawings**.

Construction

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTION-NAIRES		Less than half (45%) of the students to prepare for the simulation.
TEACHER LOGS	1. The booklet had medium effectiveness in stimulating student interest and was of medium to high technical quality. 2. The booklet provided the information necessary and could be referred to again. 3. The slide tape also had medium effectiveness in stimulating student interest with medium technical quality. One teacher commented that the music was very effective; another that it was an informative novelty.	1. One comment was that the vocabul hard. 2. There was too much information t slide tape.
TEACHER PANELS	Music good.	1. Seemed overwhelming and confusin much reading, vocabulary too dif 2. Students not motivated to contin
TRENDS	1. According to teachers, the booklet provided necessary information which could be referred to again, and was given a medium rating in both stimulation of student interest and technical quality. 2. The slide tape was given similar stimulation and quality ratings. Note, the music was considered to be good.	The preview had the following weakne - too long and too much information; - vocabulary too difficult; - not highly motivational, and too c

Preview	RECOMMENDATIONS FOR REVISION
felt that the preview helped	
y in the booklet was too rown at the students in the	1. Add color to the booklet and change the vocabulary. 2. Provide a question sheet to give students some ideas to look for in the slide tape. 3. Make the preview more dramatic so it is more important.
to students, too long, too icult, not personalized enough. e.	1. Emphasize what is going to happen at beginning; summarize at end. 2. Introduce the simulation situation sooner and more dramatically (perhaps stop-action tape technique) and get the students into the action sooner. 3. Shorten it.
ses: nfusing.	1. Improve the motivational qualities by using color in booklets, introducing the simulation situation sooner, making the preview slide tape a more active experience for the students, and shortening the preview. 2. Provide a method (e.g., question sheets, revised organization, etc.) by which students can better sort and/or understand the content of the preview, and perhaps the goals of not only the preview presentation but also the simulation itself.

Construction:

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS	—	—
STUDENT QUESTIONNAIRES	There was strong positive response (67%) to the role selection.	—
TEACHER LOGS	The Preparation was well integrated with the Preview.	1. The booklets were rated medium t vocabulary was too hard and the students didn't read, but flipp 2. There were problems with the sc 3. The Job Preference Form was con read or fill it out correctly. 4. There was difficulty in two cla
TEACHER PANELS	—	1. Vocabulary too difficult. 2. Directions unclear, role-choosi intended. 3. No provision for choice of Jr.
TRENDS	Student response was strongly positive to the role selection process. The preparation phase was well integrated with the preview.	All weaknesses cited above relate t preparation materials. These inclu clear directions, etc. Due to thes the role choosing process was not f

eparation Phase	RECOMMENDATIONS FOR REVISION
low with comments that the rections not clear. Some coins. ng on the Job Interest Form. ing and the students didn't s getting into roles.	1. Number each sheet in booklet. 2. Number the steps rather than writing in paragraphs in booklet. 3. Provide circles at bottom of Job Interest Form and label the occupations on the form for scoring. 4. Encourage students to go through whole process by giving them only one part at a time. 5. Provide instructions for where to go next.
process not followed as hitect role.	1. Lower the reading level. 2. Provide specific directions on role choosing including how to trade roles. 3. Emphasize that the architect is a leadership role in the simulation. 4. Label all pieces and list contents on all envelopes.
echnical problems in the vocabulary difficulty, un- roblems, in some instances, owed as intended.	Teacher recommendations seemed to focus on the technical problems of student implementation of the role selection process. There simply are too many separate pieces for students to work with without much clearer labelling and directions. (See above recommendations for specific suggestions).

Construction - Tasks 1A and 1B: Cont

DATA SOURCE	STRENGTHS	WEAKNESSE
STUDENT TESTS		
STUDENT QUESTION-NAIRES		
TEACHER LOGS	One teacher commented that all of the tasks were well integrated.	1. Three of the four teachers felt long enough. 2. The tasks were not appropriate t the students, who were not famil to become involved. 3. Insufficient information was giv 4. There was not enough for the sup 5. There were some resource materia slow with talking pages and gett 6. The teacher had to organize the 7. The students had trouble underst but after they understood, they
TEACHER PANELS	Talking pages good. Students enjoyed it very much.	1. Preparation didn't lead into the 2. One group skipped one portion; r for activities. 3. Directions misunderstood. 4. Papers weren't labelled. 5. Architect's payment is a loose e
TRENDS	In general, teachers felt that students enjoyed this first major activity of the simulation. A series of minor problems were identified as indicated in the next column.	1. Insufficient information is give organization and/or directions f 2. Problems with vocabulary as note appearing here and may have prev involved to the degree that they 3. Insufficient time was allotted f 4. The Preparation phase and Task 1

	RECOMMENDATIONS FOR REVISION
____________	____________________
____________	____________________
he time recommended was not the maturational level of ar enough with the vocabulary n. rintendent to do. s missing and it was very ng materials from boxes. roup. nding the task directions, id it.	1. Give more guidance on how to conduct meeting. 2. Don't name architects as Jr. & Sr. in the beginning, because the work turns out like that anyway. 3. Perhaps the teacher could guide them more in their choices. 4. The sites should be numbered and maps of the sites kept in a safe place.
task. ed a checklist or bold heading d.	1. Provide directions for paying architect. 2. Label each piece and have students put their names on the maps. 3. Provide clear and unambiguous directions about the object of the task and how to reach it. 4. Let students know that they will reuse aerial photos in Task 6.
as well as insufficient r using that information. in previous sections are also nted students from becoming otherwise might have. r the activity. were not well integrated.	1. Provide clear directions about the object of the activity and how to reach it. Make certain that all pertinent materials are properly labelled. 2. Allot more time for Task 1. 3. Consider expanding the teacher's role in guiding or assisting the students to make site choices, etc. within Task 1. 4. Re-examine the integration of the Preparation Phase and Task 1A. 5. Consider lowering the vocabulary level used in this task.

Construction - Tasks 2A and 2B: Identif

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTIONNAIRES		
TEACHER LOGS	1. These tasks were more appropriate to the students' maturational level; they understood what to do and did it. 2. Resource materials were available. 3. The students especially liked doing 2B and did a good job.	1. Three of the four teachers felt not long enough. 2. There were some failures to keep
TEACHER PANELS	1. Was nice and specific 2. Students found it fun.	If the right scale graph paper isn't
TRENDS	Teachers expressed strongly positive opinions about this activity and about student interest in the activity. Also compared to previous parts of the module Task 2 was much more easily implemented.	1. Insufficient time was allotted f 2. There was a technical problem of

ing Client's Needs and Sketching Sites

	RECOMMENDATIONS FOR REVISION
hat the time recommended was drawings to scale.	1. Check the scale of the templates. 2. If it is necessary to have more than one student per role and many groups of students calculating costs, developing site specifications, etc. then it would be helpful to have them work on the same sites.
used, the templates won't fit.	Check the scale and instructions for the graph paper.
r the activity. scale as indicated above.	1. Allot more time for Task 2. 2. Correct the scale problem indicated in the weakness column.

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTIONNAIRES		
TEACHER LOGS	1. The teachers felt that, although it took a while to get it together, the task was appropriate for the students and demanded just enough detail. 2. The students understood the task and could implement it. 3. The task was well integrated with the others.	All four teachers felt the recommend to complete the task.
TEACHER PANELS	1. Slide tape good and the point came across well. 2. Was fun for the students. 3. Demanded detail.	
TRENDS	Clearly the task went well. It was appropriate for students, they understood it, it flowed well from previous tasks, and they enjoyed it.	Insufficient time for task completi

sk 3A: Writing Specs

	RECOMMENDATIONS FOR REVISION
time was not long enough	Allow more time; one day for preparing specs from the meeting after ideas are gathered.
	Allot more time inasmuch as it seems to take students time to discuss their ideas before generating specifications.

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTIONNAIRES		
TEACHER LOGS	1. Two teachers found the task appropriate for the students' level and that the students could understand and implement the task. 2. The task was well integrated with the others.	1. All four teachers felt the recomm enough to complete the task. 2. One group had a little trouble u 3. Two groups kept losing materials 4. One teacher commented that the c up projects with her report.
TEACHER PANELS	Students beginning to feel comfortable with vocabulary.	
TRENDS	1. According to teacher comments the task went well, was integrated with previous tasks, and was understood and easily implemented by students. 2. Vocabulary difficulties began to ease at this point.	1. Insufficient time was allotted f 2. There were other minor difficult someone slowing down a group, et

: Evaluating Sites

	RECOMMENDATIONS FOR REVISION
______	______
______	______
nded time was not long lerstanding what to do. munity representative held	P.2 reemphasize that only the four sites chosen in Task 1 are to be studied.
______	______
the task. s such as loss of materials,	1. Allot more time for the task. 2. Given the weaknesses described in the second column, some attention might be paid to improving the directions for implementing the task. 3. Make it clear that students will only be working with the four sites. 4. Since vocabulary difficulties are easing at this point, the reviser may well give some thought to retaining the challenge of new words in the simulation.

Construction - Tasks 4A and 4B: Creating

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTION-NAIRES		
TEACHER LOGS	Task 4A The task was appropriate for the students' level, they understood it, and seemed to enjoy it. Task 4B The task was on the students' level.	Task 4A 1. Three of the four teachers felt long enough to complete the task 2. One teacher had to buy tracing p Task 4B There were several problems with the paper provided, how to use it.
TEACHER PANELS	Task 4A Most students understood what they were to do. Task 4B Students enjoyed it.	Task 4A Some students thought they were to d Department. Task 4B Instructions for activity on pg. 2 o should do it.
TRENDS	1. The two tasks were understood and enjoyed by students.	1. Insufficient time was allotted f 2. There was confusion about the go the facility was to include. (E may arise earlier in the módule Does the new highway destroy the associated classrooms or does it with small support buildings, sn is simply not clear.) 3. Technical problems as indicated 4. Instructions on bottom of pg. 2 is apparent that draftsman and j alone on two different sites.

	RECOMMENDATIONS FOR REVISION
he recommended time was not per. graph paper -- scale used,	
sign an entire Phys. Ed. handbook don't indicate who	Task 4A Clarify what the facility is to include. Task 4B Label activities and indicate who shall do it, the purpose of the activity, and the intended product.
r the task. l of task 4A and about what aluator's note: the confusion n the actual problem situation. school's gymnasium and its cut through outdoor facilities ck areas, etc.? This point bove. ould be clarified so that it nior architect are working	1. Allot more time. 2. Clarify what the facility is to include. (Task 4A). 3. Clarify instructions on bottom of pg. 2, as indicated in weaknesses column.

Construction - Task 5: Se

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTIONNAIRES		
TEACHER LOGS	1. Three of the teachers felt that the students could finish the task in the recommended time. 2. The task was OK in terms of student level, integration, and resource materials.	Student implementation of task.
TEACHER PANELS		1. Perhaps it was too quick. 2. Agenda not specific enough.
TRENDS	In general, Task 5 proceeded smoothly with very few problems observed by teachers.	The problem that was observed seemed specific meeting agenda which, in tu students implemented the module.

ecting Site and Design

	RECOMMENDATIONS FOR REVISION
	Delete parts of meeting.
	Make agenda more specific.
o center on not having a , may have affected the way	Recommendations are focused on the need to make the meeting agenda more specific.

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTION-NAIRES		
TEACHER LOGS	1. Got new interest into project 2. Cut-away drawing good for learning perspective	1. Three of the four teachers felt be effective. 2. Much redrawing necessary; seemed 3. Difficulty in finding materials.
TEACHER PANELS	Students "loved it".	1. (6C) Some trouble with dimensio 2. (6D) Too much drawing on top of 3. (6E) Video tape inconvenient, e 4. (6E) Couldn't find all of the m trouble relocating aerial
TRENDS	The task went extremely well and apparently "turned on" students and renewed their interest in the simulation.	Primarily, there were the weaknesses as cited above. In addition, there seemingly unnecessary redrawing of d expensive and mediocre video tape.

	RECOMMENDATIONS FOR REVISION
h more time was needed to intless	
and scale. rlier drawing assignments. nsive, and not well cued. rials called for and had tos.	1. (6C) Simplify and explain scale used. 2. (6D) Allow students to trace or use an earlier drawing. 3. (6E) Cue the video tape if used, but might substitute a super slide tape. 4. (6E) Let students know earlier that aerial photos will be needed here.
technical nature have been some gns and possibly an	1. The teachers recommended a review of the drawings with a view toward reducing redrawing where tracing or use of an earlier drawing would suffice. The problem would also be alleviated by the use of a simple and well explained scale. 2. An excellent slide tape might be substituted for the video tape, the quality of which did not seem to warrant the expense and inconvenience. 3. Cue the students earlier (See Task 1B) that the aerial photos will be needed here.

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTIONNAIRES		
TEACHER LOGS	Few comments, seemed fair to OK.	
TEACHER PANELS		1. Anticlimactic and short 2. Only one of two models used 3. No real audience
TRENDS	Teacher comments indicating that the task was fair to OK would tend to suggest the need for modification.	Anticlimactic, short and really no p were made.

	RECOMMENDATIONS FOR REVISION
__________	__________
__________	__________
__________	__________
	1. Consider combining with Task 6. 2. Use both plot model and facility model. 3. Invite someone to the unveiling.
isions for an audience	Given the enthusiasm for Task 6, the lack of enthusiasm here is quite apparent. Strongly consider rethinking this task, combining this task with Task 6, making provisions for an audience, etc. Clearly some revision is indicated.

Construction:

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS		
STUDENT QUESTION-NAIRES		
TEACHER LOGS	1. Three of the four teachers found the summary very effective as a culmination to the simulation. 2. The summary was well integrated with the preceding tasks.	1. There was not enough time to dis important. 2. Task II contained vague phrases, "levels of decisions". 3. Task II was unnecessary because to be aware of others' roles. 4. The summary was rated "somewhat students learn about others' rol of the world of work. 5. The comparison wasn't there for Form A.
TEACHER PANELS	Task 1 was seen as the strong point of the summary.	Teachers felt that Task 2 was not wo time on since the students had no ba their experiences.
TRENDS	The teachers agreed that the summary was an effective culminating device and was well integrated with the preceding tasks. Note, however, that students seemed to be more mixed in their reception of the summary.	1. Only 31% of the students respond as a device that helped to "pull 2. Insufficient time was allotted f unnecessary and contained many v were unfamiliar to students at t 3. The Job Interest Form completed vital to the success of part of had not completed it earlier may participating.

	RECOMMENDATIONS FOR REVISION
______	______
______	______
ss Task I which was .g., "working conditions", idents circulated enough fective" in helping and the simulated part idents who had not completed	______
spending a great deal of s on which to compare	Consider dropping Task 2 and substituting a group discussion.
positively to the summary hings together". Task I, and Task II was ie phrases or phrases that s level. the preparation phase is e summary. Students who ave had difficulty	1. Allot more time for Task I. 2. Consider dropping Task II and having a group discussion rather than a formal presentation.

Construction:

DATA SOURCE	STRENGTHS	WEAKNESSES
STUDENT TESTS	—	—
STUDENT QUESTIONNAIRES	—	—
TEACHER LOGS	1. One teacher rated all of the packets high in terms of providing information needed by students.	1. One teacher (two groups) rated t low, commenting that it was unne easy for most of the students. 2. Too many packets.
	*The only specific provision for collecting information about the skill packets w	
TEACHER PANELS	—	—
TRENDS	One teacher rated the packets high in terms of providing information, although that opinion was not shared by another teacher.	1. One teacher felt they were unne 2. Too many packets.

Skill Packets*	RECOMMENDATIONS FOR REVISION
________	________
________	________
information provision ssary and that it was too in the Teacher Logs.	1. All skill packets should have the numbers and everything that is in the packet written on the packet. 2. Put into book form or compress in some way. 3. Packet #6 should tell teacher when to use video tape.
________	________
ssary and too easy.	1. Improve labelling of packets. 2. Consider combining all packets into one booklet.

APPENDICES

APPENDIX A:

KNOWLEDGE TEST - "WHAT DO YOU KNOW?"

Planning

Construction

Projects

"What Do You Know?"

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PLANNING CONSTRUCTION PROJECTS

"WHAT DO YOU KNOW?"

The purpose of this test is to help us find out what you and other students like you know about the planning of construction projects. This test does not in any way affect your grade.

DIRECTIONS: To complete the test first fill in the information requested at the top of the next page. For most questions on the test there are several short phrases or statements listed. Pick the one that best describes your answer and circle the letter in front of it. For several questions special directions will be included with the questions. Please follow those directions.

If you don't know the answer to a question, GUESS. When you have completed the test return it to your teacher.

Thanks for your help.

You may turn the page and start as soon as you have completed reading the directions.

PLANNING CONSTRUCTION PROJECTS

"WHAT DO YOU KNOW?"

FILL IN THE FOLLOWING INFORMATION:

Name______________________________ Date____________

School____________________________ City____________

Age______________________________

Grade (circle one) 8th 9th other (please specify)

Sex (circle one) Male Female

Subject taught in this class______________________________

START THE TEST

1. The final plans for the construction of a project are generally the result of the effort of:

   a. The architect
   b. The draftsman
   c. The civil engineer
   d. All of the above

2. Fees for architectural services are usually determined by:

   a. Negotiations between the client and the architect
   b. Standard fees from tables
   c. The size of the construction project
   d. The number of people required to develop construction plans
   e. All of the above

3. Which of the following best describes work in planning construction projects?

   a. Usually is done outdoors
   b. Usually is somewhat hazardous
   c. Usually is done indoors
   d. Usually involves the use of power machinery

4. The result of planning a construction project may often include which of the following things?

   a. Specification of buildings
   b. Scale models of buildings
   c. Layout of building sites
   d. All of the above

5. What is the most important thing to know when you plan a construction project?

   a. The eventual use which will be made of the construction project
   b. The nature of the land on which the project will be constructed
   c. The type of material to be used
   d. The type of foundation to be used

6. Which of the following tasks does an architectural firm that is hired to plan a construction project do?

   a. Prepare drawings
   b. Hire a contractor
   c. Hire carpenters and plumbers
   d. Order building supplies

7. The national headquarters of a large insurance company is located in your city. The company has made a decision to double the size of their present office building. Who would they contact in a typical architecture firm about getting plans developed for the addition to the building?

   a. The principal architect
   b. The draftsman
   c. The artist
   d. The civil engineer

8. In regard to working in the planning of construction projects, which of the following is not important?

   a. Comfortable temperature
   b. Pleasant surroundings
   c. Good lighting
   d. Safety glasses

9. In which way do architects usually bid on construction planning?

   a. By submitting pictures of their past work
   b. By sketching examples of their ideas for the construction project
   c. By building models of their plans
   d. All of the above

10. For planning a construction project which of the following groups of tools would be most useful?

   a. Hammers, saws, squares
   b. Drawing boards, scales and triangles
   c. Electronic gauges and meters
   d. Electric drills and sanders

11. Planning construction projects requires the skills of many different people. For each of the people named below two skills are listed. Pick the skill that you think is most important to his/her work and place the number of that skill on the line next to the person named.

Skills

Principal Architect of Firm	___	1. Organizing the work of a team of people	2. Analyzing the soil at a building site
Civil Engineer	___	1. Determining the size of structural materials to be used in buildings	2. Developing the floor plans for a building
Draftsman	___	1. Determining color schemes for building interiors	2. Drawing plans for buidling interiors

12. Mrs. Smith wants to build a swimming pool in her back yard and has hired an architect to help plan it. Which of the following questions should the architect consider in planning the pool: (Check those questions that you think the architect should consider.)

_____Where are the water pipes for the house?
_____Do the Smiths swim well?
_____Is the electrical wiring for the house above or below ground?
_____Where are the trees and other shrubbery?
_____What are the local laws about swimming pools?
_____What is the amount of traffic on the street in front of the house?
_____What is the average number of people likely to use the pool?
_____How much chlorine is necessary to purify the water?
_____How many pets to the Smiths have?
_____How many swimming pools are there in the city?

13. Which one of the following activities is part of planning construction projects?

a. Hiring carpenters
b. Painting buildings
c. Purchasing building materials
d. None of the above

14. In each of the following problems there are two phrases describing different activities that people do in their jobs or things they need to know for their jobs. Read each pair of phrases carefully and decide which is more important for jobs involved in planning construction projects. Then mark an answer as follows:

Mark A if the activity described in Column A is more important
Mark B if the activity described in Column B is more important
Mark C if both are equally important

	Examples:	Column A	Column B
	[✓ A] B C	Thinking about buildings	Thinking about baseball
	A [✓ B] C	Using a hammer	Using a ruler
1.	A B C	Lifting heavy objects	Knowing strength of materials
2.	A B C	Using chemicals	Using measuring instruments
3.	A B C	Knowledge of arithmetic	Knowledge of music
4.	A B C	Using tools	Using knowledge
5.	A B C	Using symbols	Using tools
6.	A B C	Accuracy	Speed
7.	A B C	Creating	Describing
8.	A B C	Using materials	Understanding materials
9.	A B C	Using a triangle	Using a ruler
10.	A B C	Meeting deadlines	Doing quality work
11.	A B C	Working for yourself	Working for a group
12.	A B C	Planning carefully	Getting organized

15. An architectural firm in your city recently has been contracted to plan for the remodeling of the Easy-Vue Shopping Center. Who in the firm is most likely to be responsible for developing the initital sketches of the remodeling?

a. Landscape artist
b. Draftsman
c. Architect
d. Merchants from the shopping center

16. The evaluation of final construction plans is generally done by:

a. An architectural company
b. The people who need the buildings
c. Both of the above
d. None of the above

17. Which of the following people work the most with the strength and weights of special building materials?

a. An architect
b. A draftsman
c. An electrical engineer
d. A civil engineer

18. Which of the following steps comes first in the planning of a construction project?

a. Organizing to build
b. Studying the needs of the client
c. Preparing a site plan
d. Preparing working drawings

19. What statement best describes the group of people who work in "Planning Construction Projects"?

a. They seldom work together
b. They depend upon the work of each other
c. They should not show their work to each other
d. They all have passed the architect's examination

20. An architectural firm has won the contract to plan a football stadium for the Superior Blues, a professional football team. Since the stadium will be large (seating 75,000 people) it must be carefully planned. Who would be responsible for calculating how strong the stadium must be to safely seat the 75,000 people?

a. The team owner
b. The electrical engineer
c. The civil engineer
d. The draftsman

As soon as you have completed this test, please turn it in to your teacher. Thank you.

APPENDIX B:

ATTITUDE SCALE "WHAT DO YOU LIKE?"

Planning

Construction

Projects

"What Do You Like?"

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PLANNING CONSTRUCTION PROJECTS

WHAT DO YOU LIKE?

Directions:

This is not a test. The purpose of these questions is to find out what types of jobs in the planning of construction projects that you or other students like you might enjoy doing. We would also like to learn what reasons you have for liking these jobs and how you feel about exploring careers.

There are only eight (8) questions to answer. For the first five questions, place a checkmark (✓) in the column which best describes whether you like, dislike, or are uncertain about the job. If you do not have enough information about the job to answer, check the last column. List your reasons for your choice in the space provided on the right of the page.

The last three questions have space directly beneath them for you to write in your thoughts and ideas.

After you have completed the questions, please return this booklet to your teacher. Thanks for your help.

Please begin the questions as soon as you have finished reading these directions.

Question	Yes, I would like this job.	I'm uncertain about this job.	No, I would not like this job.	I do not have enough information about this job to decide.	My Reasons for My Choice Are :
. Would you like working in a job similar to that of a draftsman?					
. Would you like working in a job similar to that of a civil engineer?					
. Would you like working in a job similar to that of a landscape artist?					
Would you like working in a job similar to that of an architect?					
Would you like working in a job similar to that of an interior decorator or designer?					

6. What kinds of experiences or activities do you think people should have before they select a job in the world of work? Briefly describe or list your ideas below.

7. Have you ever thought about how you would go about selecting a job? What are the most important things that you feel people should consider before they select or decide upon a job in the world of work? Briefly describe or list your ideas below.

8. Pretend that you have interviewed for several different jobs in the last few days. Yesterday two employers called you and each offered you a job in their organization. Both employers want you to decide within two days whether or not you are going to accept their offer. Briefly describe below how you would arrive at your decision.

Please return this booklet to your teacher. Thank you.

APPENDIX C:

STUDENT QUESTIONNAIRE: "WHAT DO YOU THINK?"

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PLANNING CONSTRUCTION PROJECTS

"WHAT DO YOU THINK?"

Now that you have completed this simulation, the people who developed it would like to find out what you think about your experience. Your ideas will help to make the simulation better. Remember, THIS IS NOT A TEST and your answers will not be graded. So feel free to check and to say what you think about this simulation.

DIRECTIONS: To complete the questionnaire, first fill in the information requested at the top of the next page. Then there is a list of statements which describe a feeling or an idea about the simulation just completed. Answer each statement by circling the symbol which best matches your actual feeling:

(+) means the statement agrees with your feeling

(?) means you 're not sure how you feel about the thing mentioned in the statement

(-) means the statement does not agree with your feeling

For several other questions, special directions will be included with the questions. Follow those directions.

When you have completed the questions, please return this booklet to your teacher.

Thanks for your help.

You may turn the page and start as soon as you have completed reading the directions.

PLANNING CONSTRUCTION PROJECTS

"WHAT DO YOU THINK"?

FILL IN THE FOLLOWING INFORMATION:

Name ______________________________ Date ____________________

School ____________________________ City ____________________

Age _______________________________

Grade (circle one) 8th 9th other (please specify) __________

Sex (circle one) Male Female

Subject taught in this class ______________________________

Teacher's name ____

START THE QUESTIONS

Answer each statement by circling the symbol which best matches your actual feeling:

(+) means the statement agrees with your feeling

(?) means your're not sure how you feel about the thing mentioned in the statement

(-) means the statement does not agree with your feeling

	Circle one for each statement		
1. I learned quite a bit about jobs from the simulation.	+	?	-
2. I learned quite a bit about how to work with other people from the simulation.	+	?	-
3. To me the simulation was boring.	+	?	-
4. I would recommend the simulation to my friends	+	?	-

	Circle one for each statement		
5. I would like to go through more simulations like this one.	+	?	–
6. I would have rather done something else during the time I worked with the simulation.	+	?	–
7. The simulation helped to answer some of the questions I have about jobs.	+	?	–
8. The simulation took too long.	+	?	–
9. The simulation was over too soon for me.	+	?	–
10. Some of the tasks were too complicated or too hard for me to do.	+	?	–
11. The summary helped me to "pull things together."	+	?	–
12. I enjoyed working with other students during the simulation.	+	?	–
13. The activities that I did in the simulation were exciting to me.	+	?	–
14. I often had trouble knowing what to do next in the simulation.	+	?	–
15. This simulation was a good way of getting out of class.	+	?	–
16. There were too many tests and forms to fill out with this simulation.	+	?	–
17. The pretest and posttest were difficult for me.	+	?	–
18. The simulation preview, activities, and summary fit together well.	+	?	–
19. The preview and the other activities at the beginning helped to prepare me for the simulation.	+	?	–
20. I liked the way I selected my role(s) in the simulation.	+	?	–

BEST COPY AVAILABLE

For the next questions, either write in your answers or check (✓) the appropriate answers as indicated in the question.

21. What was your role (or roles) in the simulation "Planning Construction Projects"? (Check all that apply.)

____ Principal architect
____ Junior architect
____ Civil engineer
____ Draftsman
____ Superintendent of schools
____ Community representative
____ Board of education representative

22. Do you think that you performed well in this role (or roles)?

____ Yes, all of the time
____ Yes, most of the time
____ No, not usually
____ No, not at all

23. List a few reasons why you liked or did not like your role (or roles).

24. Would you choose this role (or roles) if you were going to be in the simulation again?

____ Yes
____ Not sure
____ No

25. Describe the one thing which you feel you did best in the simulation and the one thing you did least well. Be sure to say why you did well or poorly.

Best Thing	Reasons	Worst Thing	Reasons
____	____	____	____
____	____	____	____

26. What other roles in the simulation did you find interesting? (Check all that apply.)

____ Principal architect
____ Junior architect
____ Civil engineer
____ Draftsman
____ Superintendent of schools
____ Community representative
____ Board of education representative

27. Why do you find this role (or roles) interesting? If you do not find any other roles interesting, can you say why?

28. Compared to your feelings about the work involved in planning construction projects before this simulation, how do you feel now?

Why?

____ I am more interested now
____ I am less interested now
____ I do not feel any different now

29. Did you discover any new interests by participating in this simulation?

____ Yes, I am now interested in ________________________________
____ No

30. Name some of the things you liked most about the simulation and some of the things you liked least about the simulation.

Liked Most	Liked Least
______________________	______________________
______________________	______________________
______________________	______________________
______________________	______________________

31. Write down some of your ideas on how the simulation might be made better.

As soon as you have completed these questions, turn in this booklet to your teacher.

Thank you.

APPENDIX D:

TEACHER LOG AND

GENERAL MODULE EVALUATION

MODULE EVALUATION

TEACHER LOG

MODULE EVALUATION

TEACHER LOG

Module Title **PLANNING CONSTRUCTION PROJECTS**

Teacher Name ______________________
School ______________________
City ______________________

GENERAL INSTRUCTIONS

This instrument package is designed to obtain your reactions related to the simulation module which you are pilot testing as part of the Occupational Exploration Program. Your close association with the module places you in a unique position to evaluate overall quality, to note problems and to offer suggestions for further development and/or refinement. Hence, your candid appraisal of the module is sought by its developers. Your feedback will give direction to the revision process, which will be the next step in developing the module.

The package consists of several parts arranged in the order in which they should be used. These parts are described briefly below:

PART	WHEN TO COMPLETE	Estimated Time Required
I. Introduction to Simulation	Upon completion of the Introduction	5-10 minutes
II. Module Preview	Upon completion of Preview	5 minutes
III. Preparation Phase	Upon completion of the Phase	5-10 minutes
IV. Participation Phase (task evaluation)	As students complete each task	5-10 minutes per task
V. Summary Phase	Upon completion of the Phase	3-5 minutes

Part 1: INTRODUCTION TO SIMULATION

SIMULATION - AN EXCITING WAY TO LEARN

Part I: INTRODUCTION TO SIMULATION

SIMULATION - AN EXCITING WAY TO LEARN

Complete this part after your students have seen the slide presentation introducing the idea of simulation, have read the booklet which covers the same ideas or have used both the slides and booklet together. This part consists of several brief questions about the introduction to simulation. To respond, circle the letter of the phrase that best describes your answer. Several questions will require that you supply a short answer. Space has also been provided for you to write in any comments you have. You are encouraged to do so.

Thanks for your help.

1. How many total students in your class were introduced to the concept of simulation by one or both of the means described above?

   ___________ students

2. How many students used: (count each student only once)

   ___________ The booklet only
   ___________ The slides only
   ___________ The slides first and then the booklet
   ___________ The booklet first and then the slides
   ___________ Other, please specify ______________________________

3. Were the students able to understand concepts presented in the materials?

   a. Yes, most of the time
   b. Somewhat
   c. No, not much of the time

   Comments

4. Was the vocabulary consistent with the maturational level of the students?

   a. Yes, most of it
   b. Some of it
   c. No, not much of it

   Comments

5. How would you rate the quality of the illustrations used on the slides and in the booklet? (Answer both parts of the question.)

Slides	Booklet	Comments
a. Very Good	a. Very Good	
b. Good	b. Good	
c. Average	c. Average	
d. Poor	d. Poor	
e. Very Poor	e. Very Poor	

6. Overall, how would you rate the technical quality (appearance, ease of use, etc.) of the slides and booklet? (Answer both parts of the question.)

Slides	Booklet	Comments
a. Very Good	a. Very Good	
b. Good	b. Good	
c. Average	c. Average	
d. Poor	d. Poor	
e. Very Poor	e. Very Poor	

7. Overall, do you feel that this introduction was stimulating to students?

	Comments
a. Yes, very much	
b. Somewhat	
c. No, not much	

8. In what order would you recommend the use of the slides and the booklet? (Choose only one.)

	Comments
a. Use both in any order	
b. Use both with the booklet first	
c. Use both with the slides first	
d. Use the booklet only	
e. Use the slides only	
f. None of the above	

9. Would you recommend the use of the slides and/or the booklet to other teachers? (Answer both parts of the question.)

Slides	Booklet	Comments
a. Yes, with minor modification	a. Yes, with minor modification	
b. Yes, with major modification	b. Yes, with major modification	
c. No, I would not recommend it	c. No, I would not recommend it	

Please write in any other comments/suggestions you might have in the space below. (If extra space is required, use the back of this page.)

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Part II: MODULE PREVIEW

Part II: MODULE PREVIEW

Complete this part when your students finish the "Preview" section of the module. Please rate each form used by your students by checking (✓) the appropriate box in each applicable cell. You are encouraged to place comments and/or descriptions of any problems you encountered in the large spaces provided in each box. (Note: Answer only for the forms of the preview that your students used and count students only one time each for the second column.)

Form of Presentation	# of students using this form	Rate the effectiveness of this form in stimulating student interest	Rate the technical quality (ease of use, appearance, etc.) of this form.	Rate the quality of this form in providing pertinent information to students making decisions about module participation	Overall, how would you rate the educational quality or worth of this "Preview" form	Write in any other suggestions you have for improving the Module Preview. Also describe what you considered to be the strong points of the preview
		High ☐ Med ☐ Low ☐	High ☐ Med ☐ Low ☐	High ☐ Med ☐ Low ☐	High ☐ Med ☐ Low ☐	
Illustrated Booklet		Comments	Comments	Comments	Comments	Suggestions
Sound-slide, film, filmstrip, etc.		☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	
Game or similar activity		☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	Strengths
Other, or some combination of the above forms (please specify)		☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	☐ ☐ ☐ Comments	

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PART III - PREPARATION PHASE

PART III: PREPARATION PHASE

Complete this part after your students have finished the preparation phase of the simulation module. Questions here relate to the materials used to prepare students for participating in the simulation and the actual process of getting students into roles.

To respond, circle the letter of the choice that best describes your answer or how you feel. Some questions will require that you either check (✓) an answer or write in a short response. Space has also been provided for you to write any comments or suggestions you might have. You are encouraged to do so.

Thanks for your help.

MATERIALS

1. In the following chart: describe or name the form of material used (e.g., slide tapes, booklets, combination of forms, etc.); specify how many students used the form counting each student only once; rate the technical quality of the form; and rate its overall educational quality or worth.

   Ratings are indicated by placing a check (✓) in the appropriate box in the applicable cell. You are encouraged to place comments and/or descriptions of problems you encountered in the large space provided in each box.

Name of Form	No. of students	Rate the technical quality (appearance, ease of use, etc.) of the form				Rate the Overall Educational Quality of the Form			
		High	Med	Low		High	Med	Low	
		☐	☐	☐	Comments	☐	☐	☐	Comments
		☐	☐	☐	Comments	☐	☐	☐	Comments
		☐	☐	☐	Comments	☐	☐	☐	Comments

2. Were the students able to understand the concepts presented in the materials?

   a. Yes, most of the time
   b. Somewhat
   c. No, not much of the time

   Comments

3. Was the vocabularly consistent with the maturational level of the students?

a. Yes, most of it
b. Some of it
c. No, not much of it

Comments

4. To what extent was the preparation phase integrated with (i.e., how well did it fit together with) the Module Preview?

a. Very well, integrated
b. Well integrated
c. Somewhat integrated
d. Poorly integrated
e. Very poorly integrated

Comments

ROLE SELECTION PROCESS

5. Did the initial role descriptions provide students with enough information for selecting roles?

a. Yes, the information was adequate
b. Somewhat
c. No, the information was inadequate

Comments

6. If schematic devices (e.g., schedule cards were available to help select roles, did students understand how to use them?

a. Yes, with little or no help
b. Yes, with some help
c. Yes, with a great deal of help
d. No
e. Not applicable

Comments

7. Were the students able to independently select themselves into roles?

a. Yes, with little difficulty
b. Yes, with some difficulty
c. No, some teacher assistance was necessary
d. No, extensive teacher assistance or direction was necessary

Comments

8. If you had to help the students select roles, please describe the nature of that assistance (e.g., asked students to draw lots when several wanted the same role; explained use of schematic device; etc.) in the space below.

9. Overall, was the role selection process described in the module an effective way of getting students into roles?

a. Yes, it was effective
b. Somewhat effective
c. No, it was ineffective

Comments

10. Can you suggest other ways in which this process could occur?

a. Yes, I would suggest ______________________________

____

____

____

____

b. No, the process was effective

Please write in any other comments/suggestions you might have in the space below.

PART IV - PARTICIPATION PHASE

TASK EVALUATION

SKILLS PACKET

PART IV - TASK EVALUATION

This part should be completed on a task by task basis as your students finish each task during the participation phase of the simulation module. Please write in the number of each task and answer the questions listed at the top of each column. IN THE "PROBLEM AREA" SECTION, PLACE A CHECK (✓) IN THE APPROPRIATE CELLS WHENEVER PROBLEMS OCCUR FOR A PARTICULAR TASK. Please write any comments, problem descriptions, and/or suggestions you have in the spaces provided.

A sample of a task evaluation is provided to help you complete this form.

Task number	Class time spent on task in minutes	Teacher time spent working directly with students in minutes	Is recommended time appropriate for completing task?	Did you modify, delete, or change the position of this task in the simulation? (Specify change)	MAJOR PROBLEM AREAS					
					Appropriateness of task to maturational level of students	Integration of task with previous, concurrent, and/or following tasks	Resource materials	Special skills required of teacher and/or instructional techniques for implementing the task.	Student understanding of task directions and/or task materials	Student implementation of task
SAMPLE 2A	150	35	TAKES TWICE AS LONG AS ESTIMATED TIME		☐	☐ THIS TASK REALLY FOLLOWED UP ON IDEAS FROM PREVIOUS ONE	☐	☐	☑ DIRECTIONS WERE UNCLEAR ESPECIALLY FOR ROLE DESCRIPTIONS	☐
					☐	☐	☐	☐	☐	

PART IV - TASK EVALUATION

Task number	Class time spent on task in minutes	Teacher time spent working directly with students in minutes	Is recommended time appropriate for completing task?	Did you modify, delete, or change the position of this task in the simulation? (Specify change)	MAJOR PROBLEM AREAS					
					Appropriateness of task to maturational level of students	Integration of task with previous, concurrent, and/or following tasks	Resource materials	Special skills required of teacher and/or instructional techniques for implementing the task.	Student understanding of task directions and/or task materials	Student implementation of task
					☐	☐	☐	☐	☐	☐
					☐	☐	☐	☐	☐	☐
					☐	☐	☐	☐	☐	☐
					☐	☐	☐	☐	☐	☐

PART IV - TASK EVALUATION

Task number	Class time spent on task in minutes	Teacher time spent working directly with students in minutes	Is recommended time appropriate for completing task?	Did you modify, delete, or change the position of this task in the simulation? (Specify change)	MAJOR PROBLEM AREAS					
					Appropriateness of task to maturational level of students	Integration of task with previous, concurrent, and/or following tasks	Resource materials	Special skills required of teacher and/or instructional techniques for implementing the task.	Student understanding of task directions and/or task materials	Student implementation of task
					☐	☐	☐	☐	☐	☐
					☐	☐	☐	☐	☐	☐
					☐	☐	☐	☐	☐	☐
					☐	☐	☐	☐	☐	☐

PART IV - ILL PACKETS

In some of the Occupational Exploration simulation modules it is likely that students may be asked to occasionally engage in activities with which they have little or no background. This lack of background will not significantly impede the operation of the module but students might feel somewhat more comfortable with the activity if their background could be enhanced. To help in providing that background, skill packets, (e.g., a "drawing skills" packet, metric system skill kit etc.) have been included with several modules. Fill in the chart below for all skill packets provided with the module being used in your classroom. Write in the name of the skill packet (s), write in the number of students using the packet and then answer all questions listed at the top of each column by placing a check (✓) in the appropriate box. Please comment in the space provided with regard to any problems you might have encountered or any suggestions you might have.

Name of skill packet	# of Students using this packet	Rate this packet in terms of providing information needed by students				Rate the difficulty of packet in terms of maturational level of your students				Other Comments/Suggestions (Indicate: problems with skill packets; revision suggestions; other materials that might be used; etc.)
		High	Med	Low		Too hard	Just right	Too easy		
					Comments				Comments	
					Comments				Comments	
					Comments				Comments	

PART V: SUMMARY PHASE

PART V: SUMMARY PHASE

Complete this part when your students complete the "Summary" phase of the module. To respond, simply circle the letter beside the phrase that best describes your answer or supply the requested information. Space has also been provided for you to write in any comments/suggestions you may have.

Thanks for your help.

1. How effective was the "Summary" phase in providing a reasonable culimination to the simulation experience?

   a. Very effective
   b. Somewhat effective
   c. Not effective

   Comments

2. Was the "Summary" phase well integrated with the immediately preceding activities or tasks?

   a. Yes
   b. Somewhat
   c. No

   Comments

3. Did you have to modify or expand upon the "Summary"?

   a. Yes, I did the following ______________________________

   ____

   b. No

4. How effective was the "Summary" phase in helping students learn about occupational roles performed by others in the simulation?

   a. Very effective
   b. Somewhat effective
   c. Not effective

   Comments

5. How effective was the "Summary" phase in helping students learn about tools, processes and working conditions associated with that part of the world of work simulated in the module?

   a. Very effective
   b. Somewhat effective
   c. Not effective

   Comments

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6. How useful do you feel the "Summary" phase would be in helping students identify and select alternatives for further action related to other occupational exploration activities?

   a. Very useful
   b. Somewhat useful
   c. Not useful

   Comments

Please write in any other comments/suggestions that you might have in the space below.

Planning

Construction

Projects

General Module Evaluation

Teacher Form

GENERAL MODULE EVALUATION

TEACHER FORM

INSTRUCTIONS

This questionnaire should be filled out as soon as possible after the pilot test of this module has been completed, i.e., after the posttests have been given.

The questionnaire is divided into several sections. The first section deals with general background characteristics of students and teachers. This information will be used solely for the purpose of describing the students and teachers who participated in the pilot test of this module. Subsequent sections will deal with implementational problems, your perceptions of the quality of the materials, etc.

Fill in the information requested at the top of the questionnaire and then answer each question by circling the letter in front of the phrase that best describes your answer, unless given other specific directions in the question. Space has also been provided for you to write in any comments/suggestions you might have. You are encouraged to do so.

THANKS FOR YOUR HELP.

GENERAL MODULE EVALUATION

TEACHER FORM

Module Name PLANNING CONSTRUCTION PROJECTS Date ____________________

Teacher Name ____________________

School ____________________

City ____________________

TEACHER BACKGROUND

1. What is your sex?

   a. Male
   b. Female

2. Including this year, approximately how many years of teaching experience do you have?

   a. This is my first year
   b. 2-4 years
   c. 4-6 years
   d. 6-8 years
   e. 8 or more years

3. In what kind of group setting (e.g., English classroom, math classroom, students from study hall, students from a guidance group, etc.) and at what grade level did you introduce this simulation?

   a. Group Setting (please specify) ____________________
   b. Grade Level (please specify) ____________________

4. Have you had any previous experience with simulation as an instructional technique?

   a. Yes, as a teacher
   b. Yes, as an observer
   c. Yes, as a participant
   d. No

5. If you answered yes to question 4, briefly describe the nature and extent of your previous experiences with simulation. If your response to question 4 was 'No' please proceed to question 6.

   a. My previous experiences with simulation include ____________

   ____

   ____

   ____

6. Which of the following statements best describes your reasons for participating in the pilot test of this simulation module?

   a. To try out new ways of organizing instruction for students
   b. Interest in Career Education
   c. Thought material was of value for students
   d. General interest or curiosity
   e. I was requested to participate
   f. Other, or some combination of the above (please specify) ______

   ____

STUDENT BACKGROUND

7. How many students participated in the total simulation? (Include only those students who were involved in the module and received both the pre and posttests).

   __________ Students Participating

8. Of the students in question 7, how many were male and how many were female?

   __________ Males __________ Females

9. How were students selected to participate in the simulation?

   a. Most of the students were volunteers from the class
   b. The class, rather than the students, was volunteered
   c. Student volunteers from a study hall
   d. Other, please specify ______________________________

   ____

10. If you had volunteer students participating in the simulation which of the following reasons best describes your perception of why they participated. If you did not have any volunteer students please proceed to Question 11.

a. Interest in trying something new
b. Interest in particular area simulated
c. Interest in careers
d. Interest in just getting out of class or study hall
e. Other, or some combination of the above (please specify)

____

____

f. I can't really guess at the reason (s)

11. Indicate any special characteristics of this class, e.g., many slow readers in class; many students with exceptionally good verbal skills; etc., which may bias the results of the pilot test of this module. Also describe how you feel the results will be biased by these characteristics.

a.

Characteristics	Biases Produced
____________	____________________
____________	____________________
____________	____________________

b. No special characteristics

SEQUENCING OF MATERIALS

12. In general, how well did the transition from phase to phase of the module proceed?

a. Very well
b. Well
c. About average
d. Poorly
e. Very poorly

Comments

13. Are there any additions, deletions or changes in the order of module parts that you feel should be made?

a. Yes, make the following changes ____________________

____

____

b. No changes are necessary

ADEQUACY OF MATERIALS

14. In general, were the directions in the module clear enough for students to understand what was expected of them?

Comments

a. Yes
b. Somewhat
c. No

15. In general, was the vocabulary of the module consistent with the maturational level of the students in the simulation?

a. Yes
b. Somewhat
c. No

16. Do you feel that the knowledge (What do you know?) and the attitude (What do you like?) tests were adequate measures of the material contained in the module? (Answer both parts of the question.)

Knowledge Test	Comments	Attitude Test	Comments
a. Yes		a. Yes	
b. Somewhat		b. Somewhat	
c. No		c. No	

17. To what extent was the knowledge test difficult for students?

Comments

a. Very difficult
b. Difficult
c. About average
d. Easy
e. Very easy

IMPLEMENTATION OF THE MODULE

18. How well did the in-service training prepare you to work with this module?

Comments

a. Very well
b. Well
c. Somewhat
d. Poorly
e. Very poorly

19. Did the in-service training provide you with a general understanding of your role in the module implementation?

a. Yes Comments
b. Somewhat
c. No

20. While working with this module, did you have to allot (or spend) more time than you normally would for preparation (exclude the time spent in in-service training)?

a. Yes, specify additional time in hours _________ Comments
b. Some extra time was necessary
c. No extra time was necessary

21. How sizeable was the job of managing/coordinating this simulation module for you?

a. Very sizeable Comments
b. About average
c. Not sizeable

STUDENT PARTICIPATION AND LEARNING

22. Did your students experience problems with the reading level of this module?

a. Yes Comments
b. Somewhat
c. No

23. To what extent do you feel students were receptive (interested in, excited by) to simulation as a way of learning?

a. Very receptive Comments
b. Receptive
c. About average
d. Non-receptive
e. Very non-receptive

24. To what extent do you feel that students were receptive (interested in, excited by) to the content of this particular module?

a. Very receptive Comments
b. Receptive
c. About average
d. Non-receptive
e. Very non-receptive

25. Was there any change in student interest or motivation as they progressed through the module?

a. Yes, interest changed as follows ______________________________

____

b. Somewhat

c. No

26. Do you feel that this module reinforced or helped to build the student's ability to make decisions?

a. Yes	Comments
b. Somewhat	
c. No	
d. Don't know	

27. In your judgment, how much did students learn about the process of simulation and about the content of the module? (Answer both parts of the question)

Simulation Process	Comments	Module Content	Comments
a. Very Much		a. Very Much	
b. Much		b. Much	
c. An average amount		c. An average amount	
d. Little		d. Little	
e. Very little		e. Very little	

OVERALL PERCEPTIONS AND RECOMMENDATIONS

28. In general was this module

a. Exciting to students.	Comments
b. About average for students.	
c. Boring to students.	

29. In general did this module change the working relationships (personal interactions) between you and participating students?

a. Yes, relationship changed as follows ______________________________

____

____

b. Somewhat

c. No

30. Are there any students or groups of students (e.g., some students may have difficulty working in small self-directed groups) that you feel would have difficulty participating in simulated types of experiences?

a. Yes, (please specify) ____________________

____

____

b. No

31. For what grades would you consider this module to be appropriate? (Circle as many as apply).

a. 10th or higher
b. 9th
c. 8th
d. 7th or lower
c. Other, please specify ____________

Comments

32. Overall, how would you rate the quality of this module?

a. Very good
b. Good
c. Average
d. Poor
e. Very Poor

Comments

33. If possible, would you use this module with students again?

a. Yes, with no modification
b. Yes, with minor modifications
c. Yes, with major modifications
d. No

Comments

34. Would you recommend this module to other teachers?

a. Yes
b. No

Comments

COMMENTS AND/OR SUGGESTIONS FOR REVISION

Add as many comments and/or suggestions for revision of the module as you might have.

THANK YOU.